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RECENT EXPERIMENTAL WORK ON THE PATHOGENESIS OF MULTIPLE SCLEROSIS

RICHARD M. BRICKNER, M.D.

NEW YORK

In recent years the pathogenesis of multiple sclerosis has been investigated intensively, especially in this country. The results of these observations, made in scattered places, have never been brought together. My purpose in this communication is to summarize them and to make what comparisons appear to be possible.

In the 1870's, after the disease had been made well known by Charcot, much was said concerning possible causes. Out of this discussion some views emerged, which are still of great interest. Among the most ingenious of the hypotheses was one of Pierre Marie's, which deserves rescue from the fortgetfulness that has encompassed it.[1] Marie observed a patient who, three years following an attack of typhoid, developed multiple sclerosis; he suggested that sclérose en plaque might be a tertiary stage of typhoid in the same sense in which tabes dorsalis is recognized as a manifestation of the tertiary stage of syphilis. In the light of present day observation such an idea does not appear to be relevant to multiple sclerosis, but it may deserve consideration in respect to other more definitely infectious states, such as postencephalitic paralysis agitans.

Until recent times much of the thought about multiple sclerosis has been in terms of its being an infectious disease. Gradually, as evidence has accumulated, opinion in this country particularly has swung away from this point of view and is forming more and more what must be called a theory of toxemia. The toxemia theory is by no means a new one, however. In the 1880's it was Oppenheim's explanation; he attributed the lesions to the action of toxins—not a single toxin—most of which, he thought, were probably exogenous. In particular, he stressed lead. He had no experimental evidence; the idea came simply from the fact that many of his patients, in their occupations, were exposed to lead intoxication.

No experimental attack was made until 1913, and for good reason. Twenty years of feeling, discussion, remissions and helplessness was enough to mobilize sufficient confusion to submerge any one who studied multiple sclerosis closely. By 1896 the world was quite ready for the pleasant relaxation which the dictum of Struempell[2] made possible. Struempell earned the eternal gratitude of those who had thought to the point of exhaustion when he declared that he felt that multiple sclerosis was due to an inherent, congenital tendency of the glia to overgrow, the overrunning glia demolishing the myelin sheaths. Struempell had no shred of evidence for this idea; it was chiefly that he had seen no cases that could be explained by lead poisoning or by typhoid. But the doctrine became galenical. It was accepted as the truth, and for seventeen years workers, faced with the impenetrability and hopelessness of this dogma, rested. In passing, it is of interest to note that this highly sterile paper closed with a short paragraph in which was noted for the first time the important fact that the abdominal reflexes were lost in 67 per cent of the cases of multiple sclerosis.

In 1913, Bullock (now Gye),[3] investigating the possible infectious nature of the disease, made the first experimental attack. He inoculated rabbits and guineapigs with spinal fluid from patients with multiple sclerosis, and although he appeared to have transmitted the disease to some of the animals and although there has been some confirmation of his work, many have declared that there were faults in his technic. Despite these and the inoculation experiments of other workers, it still cannot be declared that multiple sclerosis has been experimentally produced in animals by inoculation.

The idea of infection has been more fully explored by Kuhn and Steiner,[4] and later by Steiner alone.[5] This investigator has for many years studied the possibilities of a spirochetal origin. He apparently has occasionally demonstrated spirochetes in the neural tissue in cases of multiple sclerosis. More commonly, he has been able to show what he believes to be the remains of disintegrated spirochetes. If Steiner's spirochetes were more numerous in any given case the results would be more convincing. An observer is impressed with the resemblance to spirochetes of some of the stained structures but misses the profusion of organisms which is seen in syphilis. Steiner himself believes that the scarcity of organisms is due to his having had an opportunity to examine only old cases; he has studied no specimens from individuals who had died while the process was, presumably, still fresh. Although several investigators appear to have confirmed Steiner's work, a number of others have failed to do so. The time has not yet arrived for final conclusion concerning Steiner's observations. His studies are the only contemporary ones that give any real support to the infectious theory.

Read before the New Jersey Neuropsychiatric Association, April 17, 1935.

From the Neurological Institute and the Department of Neurology, Columbia University College of Physicians and Surgeons.

1. Marie, Pierre: Sclerose en plaques et maladies infectieuses, Progr. méd. **12**: 365, 1884.

2. Struempell, A.: Zur Pathologie der multiplen Sklerose, Neurol. Centralbl. **15**: 961, 1896.

3. Gye, W. E.: The Experimental Study of Disseminated Sclerosis, Brain **44**: 213, 1921-1922.

4. Kuhn, Philalethes, and Steiner, Gabriel: Ueber die Ursache der multiplen Sklerose, Med. Klin., Vienna **13**: 1007, 1917; Ztschr. f. Hyg. u. Infektionskr. **90**: 417, 1920.

5. Steiner, Gabriel: Spirochäten im menschlichen Gehirn bei multiplen Sklerose, Nervenarzt **1**: 457 (Aug. 15) 1928.

The recent announcement of Sachs and Steiner[6] of a complement fixation test for the disease is not necessarily confirmatory of the spirochetal theory.

The Purves-Stewart-Chevassut spherula insularis has long since been entirely discarded.

The toxemia point of view has gained support in recent times from several sources. Investigations in the last few years have produced evidence for it, although, both individually and collectively, the results of all these studies must still be regarded with conservatism. The term "toxemia" is used here in a broad sense, referring to the action of any myelinolytic substance, or even condition, on the myelin sheaths. This substance or condition need not be toxic for any structure in the body other than the myelin sheath. It need not be one single substance—there may be a variety of them, all having the same capacity to cause myelin disintegration. From the standpoint of toxemia, the active agent would not be of an infectious nature. This conception also implies that the myelin does not degenerate because of a progressive gliosis.

As an introduction to such a toxemia theory, it would be well to refer to the conceptions of Hallervorden,[7] although his papers appeared at a later date than some of the other works to be discussed. Hallervorden was much impressed by the pathologic appearance of a case described in 1928 by Balo.[8] Later Hallervorden and Spatz[9] described two additional similar cases. The lesions were chiefly in the form of concentric rings of demyelinization, and in the center of each focus was a blood vessel. Hallervorden recalled the earlier (1898) experiments of Liesegang, who had performed a series of tests. He dissolved ammonium or potassium bichromate in gelatin; drops of silver nitrate were placed on the surface of the gelatin. The silver nitrate, diffusing into the gelatin, reacted with the bichromate to form the dark silver chromate. But instead of forming as a solid black mass the silver chromate appeared in concentric rings. This was explained as follows: The silver nitrate reacted with the first bichromate it encountered, forming the black silver chromate. The resultant silver chromate adsorbed the additional adjacent bichromate. Thus, a zone was left without any bichromate. The silver nitrate, diffusing into this bichromate-free area, had nothing to react with, so that this zone remained uncolored. The next black ring was formed at the point at which silver nitrate again came into contact with bichromate. The whole reaction was repeated again and again.

Hallervorden, seeing an analogy between Liesegang's chemical experiments and Balo's case, came to the belief that in that case the myelin had been caused to disintegrate precisely in the same way that Liesegang's rings were formed; namely, by diffusion of a demyelinating agent from a central point. This would imply that the neural tissue, in its living state, served as an inert colloid comparable to Liesegang's gelatin. Hallervorden was ready to adopt this as a hypothesis.

Hallervorden bridged the gap between Balo's disease and multiple sclerosis by quoting a case of Steiner's in which, besides the orthodox type of plaque, there was one in which the demyelinization took the form of concentric rings. He thought that the rarity of this concentric arrangement in multiple sclerosis was not a convincing argument against the diffusion principle, since diffusion through colloids can, of course, take place in various ways, and not necessarily with the production of concentric rings. He considered that he had presented a fair argument for the general principle of diffusion as the mechanical background in many types of demyelinating disease, including multiple sclerosis. There is no doubt that Hallervorden's ideas are interesting and should serve as a part of the toxemia conception of multiple sclerosis, even though nothing was actually proved by his work.

Actual testing of the toxemia theory has been carried out in two main ways. One approach has been the attempt to produce demyelinization in animals by the injection of any toxins which would yield results. The other has been the effort to identify a certain toxin, the presence of which is suspected—a toxin with specific lipolytic action. It can be said at this point that, while each of these approaches has yielded information, neither has solved the problem.

The only investigator who has directly produced demyelinization by experimental toxemia is Ferraro.[10] He injected small doses of potassium cyanide into monkeys and cats and, in the majority of instances, obtained multiple areas of demyelinization. It is of considerable interest that some of his lesions had the concentric appearance to which Hallervorden gave so much thought. The idea of using potassium cyanide as the toxin is not far fetched, although it might seem to be at first consideration. Ferraro observes, apropos of the metabolic rôle played by cyanide:

> Cyanide is part of our intermediary metabolism and, according to Werner, the hydrolysis of urea by acids or bases would result in a dissociation into ammonia and cyanide acid. According to A. P. Matthews, in the course of biological oxidations isocyanic acid may be formed, which undergoes rearrangement with ammonia into urea. Salkowsky also believes that urea may be formed by the transformation of cyanamide, and Fosse considers cyanic acid the immediate precursor of urea.
>
> Recently Brand and Harris expressed the belief that on the basis of the cyanic acid theory of Salkowsky, Werner and Fosse creatine may possibly arise from a side reaction between cyanic acid and glycine.

Intensive work has also been done by Putnam and his collaborators[11] in the use of toxins, but from a modified point of view. They have produced patchy demyelinization in dogs by the employment of tetanus toxin, carbon monoxide poisoning and the injection of cod liver oil emulsion resulting in the formation of emboli.

From all these results it seems quite clear that patchy demyelinization can be induced in the intact animal by the injection not only of toxins but of different toxins, and perhaps by a variety of mechanisms. Putnam's explanation, however, does not invoke the direct action of the toxin on the myelin. He believes that these substances exert their effect by producing venous emboli or thrombi, which, by causing a slight relative anemia, induce local myelin disintegration. That this is possible has been shown by Putnam, in experiments with the injection of bland, oily substances against the blood stream into the ligated longitudinal sinuses of dogs. Perivenous demyelinization was the outcome. The

6. Sachs, H., and Steiner, G.: Serologische Untersuchungen bei multipler Sklerose, Klin. Wchnschr. **13**: 1714 (Dec. 1) 1934.

7. Hallervorden, J.: Zur Pathogenese der multiplen Sklerose und ein Vorschlag zur Therapie, München. med. Wchnschr. **79**: 602 (April 8) 1932.

8. Balo, Josef: Encephalitis Periaxialis Concentrica, Arch. Neurol. & Psychiat. **19**: 242 (Feb.) 1928.

9. Hallervorden, J., and Spatz, H.: Ueber die konzentrische Sklerose und die physikalisch-chemischen Faktoren bei der Ausbreitung von Entmarkungsprozessen, Arch. f. Psychiat. u. Nervenkrankh. **98**: 641, 1933.

10. Ferraro, Armando: Experimental Toxic Encephalomyelopathy, Psychiatric Quart. **7**: 267 (April) 1933.

11. Putnam, Tracy; McKenna, John, and Evans, Joseph: Experimental Multiple Sclerosis in Dogs from Injection of Tetanus Toxin, J. f. Psychol. u. Neurol. **44**: 460, 1932. Putnam, Tracy; Morrison, L., and McKenna, John: Experimental Demyelination, Tr. Am. Neurol. A. **57**: 451, 1931. Putnam, T. J.; McKenna, J. B., and Morrison, L. R.: Studies in Multiple Sclerosis: I. The Histogenesis of Experimental Sclerotic Plaques and Their Relation to Multiple Sclerosis, J. A. M. A. **97**: 1591 (Nov. 28) 1931. Putnam, Tracy: The Pathogenesis of Multiple Sclerosis: A Possible Vascular Factor, New England J. Med. **209**: 786 (Oct. 19) 1933.

presence of such thrombi in the nervous systems of individuals dying with multiple sclerosis is also attested by Putnam. It should not be understood, however, that Putnam believes that thrombi are necessarily the result of toxic action in the human patient. He remains, at present, uncertain as to their origin.

Still another modification of the general toxic approach has been that of Rivers and Schwentker.[12] He has recently produced patchy demyelinization in monkeys by the frequently repeated intramuscular injection, over a long period, of an alcoholic extract of brain lipoids. In this study the authors considered that they were working with an allergic process. They believed that they were administering an antigen to which the neural myelin might be sensitive. Actually, this may not be the explanation of the results. It is perfectly possible that a straightforward toxin was being given which acts, perhaps in the same general way as the toxins used by Ferraro and by Putnam.

These are the well controlled pieces of work which have been done in the production of experimental demyelinization. There is no question that they have produced results.

The difficulty with this type of approach, as it has thus far been used, is, in my opinion, a very serious one. It is impossible to link the experimental results with the disease or syndrome of multiple sclerosis except by syllogistic argument. It can indeed be said that pictures resembling multiple sclerosis have been produced in animals, but the disease itself has not. This will be accomplished only when patchy demyelinization has been caused by the injection into animals of material obtained from human patients. This, of course, is not the only criterion, but it is a prerequisite to all others. Steiner's work, and some of the earlier attacks from the standpoint of infection, did make use of human material, but, as has been stated, these efforts still lack final confirmation.

A different type of approach to the toxemia theory has also been made. The attempt was not to produce experimental demyelinization but to consider patients themselves in an effort to learn whether demyelinating agents or conditions might exist in vivo.

From this standpoint, Cone, Russel and Harwood[13] have made an inquiry into the rôle of lead poisoning in multiple sclerosis. These authors conceived the ingenious idea that the periods of exacerbation and of remission in multiple sclerosis might be associated with the mobilization into the circulation, and the removal from it, of lead. Their studies yielded some evidence that such may indeed be the case. The chief obstacles to final acceptance of their idea are two: the difficulty inherent in quantitative estimations of the amount of lead present in body fluids, and lack of information concerning the amounts of circulating lead which should be considered normal for a given individual. As these matters are gradually elucidated, the part played by lead in multiple sclerosis will undoubtedly be better understood.

The suggestion was made by Marburg, many years ago, that the lesions in multiple sclerosis might be the result of the action of an enzyme which destroys lecithin. No attempt was made to investigate this idea until 1929, when, in ignorance of Marburg's idea,[14] I commenced an experimental attack from the same point of view. The plan was to seek not particularly a lecithinase but a lipolytic agent of any sort which might affect myelin. The first experiments consisted in the immersion of segments of the spinal cord of rats in blood plasma from patients with multiple sclerosis. Sections of these cords after twenty-four hours of such immersion showed that multiple sclerosis blood had a demyelinizing action which was not demonstrable in blood from controls. The part of the blood which gave the best results was the plasma. The results were very suggestive but not sufficiently marked. They did indicate that the blood of patients contained something which had a demyelinizing potentiality. Weil and Cleveland[15] were able to confirm these observations, although they employed serum instead of plasma and used a different method of studying lipolysis.

From that time until the present, the inquiries from this point of view have been of a chemical nature.[16] The aim has been to learn whether the apparent difference between the lipolytic activity of multiple sclerosis and control blood could be more firmly established. Two different types of chemical attack have been made, and both have indicated that such a difference does exist. Serum has been employed instead of plasma, as a matter of convenience. The working principle has always been the mixture of the serum with a lipoid. Lecithin was used as the substrate in one series and certain esters were used in the other. Measurement was made of the degree to which the lipoid was broken down by the serum. This was easily done by estimating the amount of fatty acid produced in the mixture after an incubation period of twenty-four hours. It was always found that there was a decided difference between the various characteristics of the lipoid breakdown caused by the action of multiple sclerosis and of control serums. The manner in which these differences showed themselves is intricate and elaborate and it is not essential to relate them here. The chief difficulties with these results are their complexity of interpretation and the fact that it has always been necessary to make the comparisons in groups. It was always a group of control serums that had to be contrasted with a group of multiple sclerosis serums. It was never possible to obtain results sufficiently sharp to enable one to identify a given case as one of multiple sclerosis. The continued search for a method which could accomplish this has led to an unexpected observation, which will be discussed later.

While these studies were proceeding, Weil[17] and Crandall and Cherry[18] of Chicago were interested in similar conceptions. Crandall and Cherry reported in 1932 that they could confirm my results in the investigation of lipolytic activity. They also found differences between multiple sclerosis and control bloods when the lipolytic action was tested. Their method differed partly in the employment of olive oil as a substrate and their interpretation was totally different. They made the suggestion that the lipolytic changes might be dependent on liver damage.

12. Rivers, Thomas, and Schwentker, Francis: Encephalomyelitis Accompanied by Myelin Destruction Experimentally Produced in Monkeys, J. Exper. Med. **61**: 689 (May) 1935.
13. Cone, William; Russel, Colin, and Harwood, Robert: Lead as a Possible Cause of Multiple Sclerosis, Arch. Neurol. & Psychiat. **31**: 236 (Feb.) 1934.
14. Brickner, Richard: Studies on the Pathogenesis of Multiple Sclerosis, Arch. Neurol. & Psychiat. **23**: 715 (April) 1930.
15. Weil, Arthur, and Cleveland, David: A Serologic Study of Multiple Sclerosis, Arch. Neurol. & Psychiat. **27**: 375 (Feb.) 1932.
16. Brickner, Richard: Studies of the Pathogenesis of Multiple Sclerosis: II. Evidence of the Presence of an Abnormal Lipase in the Blood in Multiple Sclerosis, Bull. Neurol. Inst., New York **1**: 105 (Jan.) 1931; III. Further Evidence of Abnormal Lipolytic Activity in the Blood in Multiple Sclerosis, Bull. Neurol. Inst., New York **2**: 119 (March) 1932.
17. Weil, Arthur: (*a*) The Effect of Hemolytic Toxins on Nervous Tissue, Arch. Path. **9**: 828 (April) 1930; (*b*) A Study of Etiology of Multiple Sclerosis, J. A. M. A. **97**: 1587 (Nov. 28) 1931.
18. Crandall, Lathan, and Cherry, Ian: Blood Lipase, Diastase and Esterase in Multiple Sclerosis; a Possible Index of Liver Dysfunction, Arch. Neurol. & Psychiat. **27**: 367 (Feb.) 1932.

Accordingly, Weil and Crandall[19] ligated the cystic or pancreatic ducts in dogs, following which they frequently obtained demyelinization in the nervous system of the animals. A demyelinating substance was also demonstrable in the blood, as tested by the rat cord immersion method. This material was declared not to be an enzyme, since it survived the effects of heat and since its presence appeared to be independent of the level of other lipases in the blood.

Karady[20] has also confirmed the finding of lipolytic abnormalities in multiple sclerosis serum. He has gone further and demonstrated lipasic changes in the duodenal contents in multiple sclerosis.

In addition, Weil[17b] has looked for a "myelolytic toxin" in the urine of patients with multiple sclerosis. He has found it, according to tests made with the rat cord immersion method. He states that it too is thermostabile and is therefore not actually an enzyme.

Further study is required for the elucidation of these points. The same is to be said for my own investigations. Granted that a difference exists between the ability of blood from control and that from multiple sclerosis patients to split various lipoids, of what does this difference consist? There are a number of possibilities, and the profession is not in a position to choose between them. The alternatives are:

1. That the action is that of an enzyme. If it is an enzyme, it may be

A. An abnormal enzyme.

B. A normal enzyme in abnormal quantity.

C. A normal enzyme in normal quantity, but in an abnormal milieu, which makes it act in abnormal fashion.

2. If it is not an enzyme, it may be

A. A foreign substance with lipolytic power.

B. A normal lipolytic substance in abnormal quantity.

C. A normal lipolytic substance in an abnormal milieu, which causes it to act abnormally.

In addition, it has not been proved that this abnormal lipolytic activity is actually of primary importance in the pathogenesis of multiple sclerosis. It accompanies multiple sclerosis, but it may still be a by-product of some other process.

It may be seen, then, that the present status of knowledge of the cause of multiple sclerosis is not very satisfactory. Part of the confusion may be due to uncertainty as to whether multiple sclerosis is really a disease entity, with one single cause, or whether it is a syndrome which may be produced in a variety of ways. It seems likely that some of the studies described, when carried further, may help to clarify this phase of the matter. Moreover, some experimental data concerning the disease have been obtained, and it is interesting to evaluate the general trends that they indicate. Is there anything in common between these various endeavors?

They do, in united fashion, emphasize the growing belief that there is little general evidence in favor of an infectious origin for multiple sclerosis. The usual absence of fever except in acute cases, the absence of evidence pertaining to contagion and the lack of any convincing indications of infection on microscopic study of the lesions all form a background for this trend—a belief which has been stressed by others in this country, notably by Hassin. Even the occasional outbreak of multiple sclerosis after a general infection must be interpreted with reserve. The explanation may well be that the infection merely excites the process, without causing it, just as trauma may do. Certainly it is common to see exacerbations, in well established cases, after incidental infections or trauma. Also, some of the approaches furnish support for the idea that a toxemia, operating by one mechanism or another, is at least capable of explaining the diffusely scattered lesions of the disease.

In what manner may the lipolytic investigations be related to the others? Some very general theoretical statements about this can be made. As has been stated, Putnam recently reported the finding of thrombi in many of the smaller vessels close to plaques. If Putnam's observations and conceptions find substantiation, the causation of the thrombi has yet to be explained. But Weil has pointed out that many different toxins, which are at the same time hemolytic, may cause demyelinization of nerve fibers, as tested by the rat cord immersion method. It is not impossible that the lipolytic material with which Weil, Crandall, Cherry and I have been working is active not only on the myelin sheath but also on the erythrocytes. Conceivably such erythrocytic alteration could lead to the formation of Putnam's thrombi.

Some additional recent work has been related only indirectly, if at all, to the pathogenesis of multiple sclerosis. It is more directly concerned with serologic and blood chemical factors, in their relation to activity of the disease as contrasted with inactivity.

Sachs and Steiner[6] have announced the discovery of a complement fixation test for multiple sclerosis which is comparable to the Wassermann reaction. The facts appear to be impressive, and if the results are confirmed an extremely important step will have been made in the advance on the disease. It would not necessarily mean that the disease is a spirochetal or even an infectious one, but it would serve as a quick and convenient method of diagnosis and of estimating activity or inactivity of the disease. It could also be used as a check on therapeutic procedures. For all these reasons it would be a most useful tool in the further investigation of the etiologic factors responsible for the disease. The relations between the lipolysis studies and the complement fixation reaction would also require elucidation.

The most recent phase of the work on lipolytic action has been concerned with the changes occurring in the blood during remission.[21] A new technic has been employed, and it is probable that we are working with a different lipolytic agent than before. In these experiments the results can be summed up as follows:

1. The agent has been proved to be enzymic in character. Since the substrate used was an ester (methyl butyrate) the enzyme is an esterase.

2. In active multiple sclerosis the degree of serum esterase activity is low. (Clinical activity of the disease is estimated in the following empirical manner: minimal activity is existent if there has been at least one new symptom within the previous four months and this new symptom has not improved; a case is inactive if there have been no new developments within four months or if all the symptoms have improved and there have been no concomitant regressions in that interval.)

3. During inactivity the degree of serum esterase activity is high.

4. It appears to be true, although the definite assertion cannot be made at this time, that the action is

19. Weil, Arthur, and Crandall, Lathan: Die Beziehungen zwischen Lipasegehalt und der neurotoxischen Wirkung des Serums nach experimenteller Leberschädigung, Ztschr. f. d. ges. Neurol. u. Psychiat. **140**: 577, 1932.

20. Karady, I.: Studies on the Lipase Contents of the Duodenal Juice and the Serum in Multiple Sclerosis, Orvosi hetil. **78**: 394 (May 5) 1934.

21. Brickner, Richard: Blood Esterase Changes Associated with Clinical Activity and Inactivity in Multiple Sclerosis, Bull. Neurol. Inst., to be published.

greatest at the beginning of inactivity and is gradually reduced as inactivity continues. At all events it rarely, if ever, reaches the low range shown by active cases.

5. In a few cases studied during activity, and again after inactivity had begun, the indicated change was quite abrupt.

6. The experiments show that the presence of a small amount of quinine hydrochloride in the flask containing the serum and the ester stimulates the action of the esterase. Thus, the first actual experimental support for quinine therapy in multiple sclerosis is obtained.

7. The observations may be useful

A. In improving one's knowledge of what happens during remissions. It is quite possible that the high esterase value is connected with the repair of injured myelin.

B. As a test of activity of the disease.

C. As a standard by which to evaluate therapeutic investigations.

CONCLUSION

It seems fair to say that there is enough information at hand even now to justify the hope that investigators are heading in similar directions and that union and solution may not be too far distant.

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FRACTURES OF THE PATELLA

RESULTS OF TOTAL AND PARTIAL EXCISIONS OF THE PATELLA FOR ACUTE FRACTURE

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It is our purpose in this paper to present a new conception of the treatment of the acute fracture of the patella. The ideas herein set forth have been used in a sufficient number of instances in a large charity service and in the private practice of one of us (W. E. B.) to warrant our bringing them to the attention of those treating this type of injury.

That the treatment of fractures of the patella is still open for discussion is attested by the number of procedures recently devised for dealing with the condition. It is noteworthy that all the newer methods aim at a more rapid restoration of the patient to economic usefulness.[1]

Following the lead of Gallie and LeMesurier,[2] procedures using fascial transplants have been described by Allen,[3] Haggart,[4] and Leavitt.[5] They all involve the preparation of another operative field to obtain the transplant but in hands of the aforementioned writers are productive of good results. Ober[6] uses narrow strips of the aponeurosis of the extensor tendon above the proximal fragment, where they are secured and then passed longitudinally through drill holes in the upper fragment and attached to the periosteum of the lower fragment and the patellar ligament. Anderson[7] proposes a pin method combined with opening of the fracture site to remove clots and prolapsed patellar capsule.[8] Recent textbooks do not mention the management advocated by any of these authors but confine their descriptions to the older methods of open reduction and suture of the fragments[9] or cerclage with silk.[10] The older treatment[11] of open reduction with drilling and suture of the fragments by wire, kangaroo tendon, or catgut are in standard use[12] and have been unchanged essentially for nearly seventy years.[13] The fragments of the patella are drilled transversely or longitudinally and are held in place by silver wire,[14] phosphobronze wire,[15] and various absorbable materials.[16] The fragments are sometimes held in place without bony fixation,[17] or by cerclage.[18] With a small comminuted lower portion, the proximal fragment may be drilled longitudinally, a kangaroo tendon placed in the patellar ligament about the distal comminuted area and this drawn up through the drill holes and tied at the proximal end of the large fragment.[19] This method proposed by Thompson is a good treatment and excisions of the lower fragment are discussed later.

Old fractures of the patella, if the fragments cannot be readily freshened, approximated and sutured,[20] are the subject of ingenious operative procedures requiring better than average surgical skill.[21] We suggest that the removal of the upper fragment or of the whole patella in these cases with the fashioning of a new extensor tendon from adjacent quadriceps fascia might be as efficient and is surgically a less formidable undertaking.[22]

We are not concerned here with the problem of the treatment of the acute fracture of the patella when open reduction is contraindicated.[23]

From the Department of Orthopedic Surgery, the Receiving Hospital, Detroit.

1. Scudder, C. L.: The Open or Operative Treatment of Fresh Fractures, Boston M. & S. J. **142**: 289, 1900.

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3. Allen, A. W.: Fractures of the Patella, J. Bone & Joint Surg. **14**: 640 (July) 1934.

4. Haggart, G. E.: Fracture of the Patella, S. Clin. North America **12**: 773 (June) 1932.

5. Leavitt, P. H.: Fascial Strips in Patellar Fractures, New England J. Med. **203**: 728 (Oct. 9) 1930.

6. Ober, F. R.: A New Operation for Fracture of the Patella, J. Bone & Joint Surg. **14**: 640 (July) 1932.

7. Anderson, Roger: An Ambulatory Method of Treating Fractures of the Patella, Ann. Surg. **101**: 1082 (April) 1935.

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12. Bickham.[20] Burghard, F. F.: Operations for Fracture of the Patella, in Oxford Loose Leaf Surgery, New York, Oxford University Press (supp.) 1926, vol. **2**, pt. 1, pp. 64-77. Cotton, F. J.: Patella Fracture, in Lewis, Dean: System of Surgery, Hagerstown, Md., W. F. Prior Company **2**: 143-147, 1928. Eliason and Hinton.[41]

13. Lister, Joseph: A New Operation for Fracture of the Patella, Brit. M. J. **2**: 850, 1877.

14. Higgins, T. T.: Fracture of Both Patellae by Muscular Action, Brit. M. J. **1**: 1006 (May 30) 1925.

15. Groves, E. W. H.: Material and Technique of Wire Suture of Bone, Lancet **2**: 945, 1912.

16. Jones, R. W.: Fractures Involving the Knee Joint, Canad. M. A. J. **24**: 803 (June) 1931.

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19. Thompson, J. E. M.: Comminuted Fractures of the Patella, J. Bone & Joint Surg. **17**: 431 (April) 1935.

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22. Speed, Kellogg: A Textbook of Fractures and Dislocations, Philadelphia, Lea & Febiger, 1928, pp. 736-758.

23. (*a*) Hertzler, A. E.: A Pin Method for the Approximation of the Fragments in Fractured Patella, Surg., Gynec. & Obst. **32**: 273 (March) 1921. (*b*) Roberts, J. B.: Bony Union of Transverse Fracture of Both Patellae Without Operative Suture, Ann. Surg. **64**: 116, 1916; (*c*) Subcutaneous Fixation of Transverse Fractures of the Patella, ibid. **74**: 105, 1921.

We have not seen a frontal fracture of the patella.[24] Fractures of the patellar border without displacement,[25] longitudinal fractures,[26] certain stellate fractures and transverse or oblique cracks without displacement of the fragments are treated by us with a walking-iron cast to the midthigh and immobilized in extension for from six to eight weeks. No record of these cases is included in this paper. Compound fractures[27] are treated conservatively until infection has cleared and then sutured or excised, depending on the operator. Simultaneous bilateral fractures of the patella[28] occurred in five of our cases and are summarized in table 4.

All the methods previously referred to for the open reduction of the patella contemplate the accurate reposition of the fragments and their fixation by various means with longer or shorter periods of immobilization, depending on the operator and the type of procedure used. Bony union is the criterion of success, although close fibrous union is usually functionally as efficient.[22] The patella, of all bones, is the most susceptible to refracture.[29] It is important and sometimes difficult to get exact reposition of the posterior articular surfaces of the fragments.[30] When a foreign body such as wire is introduced for suture material, this must sometimes be removed, and it may cause rarefaction of the bone.[31] Adhesions to the femur sometimes complicate the end result.[32]

TABLE 1.—*Age Distribution of the Patients in a Series of Fifty-Five Fractured Patellas*

Age	Cases
11 to 20	2
21 to 30	9
31 to 40	16
41 to 50	13
51 to 60	11
61 to 70	4

To obviate these difficulties, the method of subtotal resection of the patella or, when indicated, total excision of the patella is proposed. Briefly we advocate the excision of the upper fragment or fragments in those cases in which there is a sizable lower fragment left for attachment of the quadriceps tendon and aponeurosis. In those instances in which the patella has been markedly comminuted with wide separation of the fragments and a sizable lower fragment is not left, we advise the removal at once of the whole patella.

Neoplasms and granulomas of the patella have been dealt with by excision[33] but as far as we know partial or total excisions of the patella have never been advocated as primary measures in the acute fracture. Heinech[33] quoted a series of twenty-one excisions of the patella for various disorders and seven of these were comminuted fractures. He strongly opposed the excision of the kneecap on cosmetic and functional grounds and lamented the loss of protection to the knee joint. The foregoing series were from the literature up to 1909.

The rationale of the removal of the upper fragment or fragments of the patella for acute fracture calls for some discussion. Although the end result of the removal of the lower fragment was excellent in two of three cases in which this operation was performed and the end result in the remaining case was unknown, we do not advise the removal of the lower fragment of the patella on theoretical grounds. The extensor apparatus of the knee is composed of the quadriceps extensor group of muscles, the patella and the patellar ligament. The patella itself, owing to its attachment to the inelastic patellar ligament, moves very little if any proximally or distally in movements of the knee joint. Furthermore, the apex of the patella is embedded in the patellar ligament and in the infrapatellar fat pad. Thus the lower end of the bone is fixed and is analogous to the olecranon process of the ulna in this regard. On the other hand, the base of the patella receives the insertion of the rectus femoris tendon and the tendon of the lateral vastus muscle. Muscle fibers and aponeurosis of the medial vastus muscle and the medial and lateral retinacula patellae are likewise inserted into its medial and lateral borders respectively and form the walls of the knee joint capsule. In any operation for fracture of the patella, whether it is excision or some one of the suturing procedures, it is imperative that we be very careful to suture the lateral and medial rents in the knee joint capsule. The success or failure of this one factor will determine the difference between a fair result and one that is excellent.[34] Provided then that one has been careful to suture the tears in the knee joint capsule up to the sides of the patella, it can matter little if one removes the fragments above the line of fracture and the suture line in the capsule. We do this instead of attempting a doubtful repair with drilling of small fragments or encircling them with the likelihood of getting only a fair anatomic result and often one which does not lead to bony union.[35]

The patella glides on its posterior surface on the intercondylar notch of the femur and is interposed between the extensor muscles and the patellar ligament, helping as it were to guide the extensor action from the thigh to the anterior tubercle of the tibia. The results of the removal of the upper third, upper half, or upper two thirds of the patella or, in fact, the whole patella with suitable indications, would not be productive of serious consequences. In kneeling,[36] the pressure comes on the patella and the anterior tibial tubercle and in partial removal of the patella, even up to two thirds, the protection to the knee joint from knee-high objects could hardly be said to be lost. If the patella is removed, of course, the condyles of the femur and the tibial condyles are somewhat more exposed to direct trauma than formerly. By sharp dissection close to the bone, the extensor apparatus is preserved for attachment to the patellar ligament when a total excision operation has been performed or for attachment to the fascia and periosteum in front of the remaining fragment, where a subtotal excision has been done.

Interrupted sutures are used throughout, as it is felt that the mattress suture produces a dehematization of

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29. Corner.[35] Speed.[22]
30. Scudder, C. L., and Miller, R. H.: Certain Facts Concerning the Operative Treatment of Fractures of the Patella, Boston M. & S. J. **175**: 441 (Sept. 28) 1916.
31. Wakeley, C. P. G.: Fractures of the Patella and Their Treatment, Practitioner **122**: 238 (April) 1929.
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34. Higgins.[14] Rixford, Emmet: Fracture of the Patella, S. Clin. North America **6**: 327 (April) 1926.
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36. Callander, C. L.: Surgical Anatomy, Philadelphia, W. B. Saunders Company, 1934, pp. 969-977.

the tissues incompatible with quick healing of the extensor apparatus. In the first few cases and in an occasional later case, attempts were made to reform a "pocket" of peripatellar tissue in cases of total excision or tissue from about the fragment removed to provide for the regeneration of a new patella. These "patellar-

TABLE 2.—*Summary of Operations and End Results in Patients Who Had Various Suturing Procedures* *

Case	Patient	Race	Sex	Age, Years	Observed	Operation	Result
1	A. A.	White	♀	49	8 mos.	Kangaroo tendon through drill holes	Fair
2	D. B.	White	♀	38	15 mos.	2 double chromic catgut no. 2 through drill holes	Good
3	C. C.	White	♀	40	9 mos.	Kangaroo tendon through drill holes	Excellent
4	J. D.	Negro	♂	56	36 mos.	Kangaroo tendon through drill holes	Excellent
5	T. D.	White	♂	35	14 mos.	Kangaroo tendon through drill holes	Fair
6	V. G.	White	♀	27	12 mos.	Kangaroo tendon through drill holes	Excellent
7	P.Y.L.	Oriental	♂	38	16 mos.	2 double chromic catgut no. 2 through drill holes	Excellent
8	M. L.	White	♂	41	12 mos.	Capsule sutured	Fair
9	A. M.	White	♂	12	10 mos.	Capsule sutured	Excellent
10	J. M.	White	♂	62	14 mos.	Kangaroo tendon through drill holes	Fair
11	L. M.	White	♂	62	7 mos.	Kankaroo tendon through drill holes	Fair
12	G. M.	White	♀	37	34 mos.	Kangaroo tendon through drill holes	Good
13	E. O.	White	♂	65	17 mos.	Capsule sutured	Good
14	A. R.	White	♀	28	26 mos.	Kangaroo tendon through drill holes	Excellent
15	F. T.	White	♂	43	37 mos.	Kangaroo tendon through drill holes	Excellent

* Of the total of thirty-five operated on in this manner, the results in twenty are listed as unknown, as stated in the text.

plasties" were abandoned and simple suture of the patellar ligament and extensor aponeurosis was carried out with equally good results.

The skin incision may be any one preferred by the operator provided there is adequate exposure of the whole extensor apparatus, including the lateral ligaments of the knee joint.

Following operation, it is our custom to apply a posterior mold or a cast to immobilize the knee in full extension. If the postoperative course is uneventful, passive motion is started on the ninth or tenth day and the patient is gotten out of bed. This is followed by passive motion three times daily for four days and then active motion with the patient up and about on crutches. Weight bearing is started any time after two weeks following the operation. The patient leaves the hospital with a tight flannel bandage about the knee and crutches or cane to steady him rather than to take much of his weight. From then on his recovery is rapid and most of these patients can do light work within from six to eight weeks following operation. Work requiring stair climbing or heavy manual labor is prevented by a certain amount of pain and stiffness residual in any severe knee injury. In the younger group of patients, heavy work can be done at the end of three months.

Most of the operations proposed for the suture of the patellar fragments are followed by a period of postoperative immobilization varying from four to twelve weeks. In those more recently described procedures which involve the use of fascial transplants, there is always a question whether the fragments are going to stay in place once they have been put there and whether the transplant is going to be an effective immobilization during those early weeks when the fracture line is strained by any motion. Conversely, it is highly important to secure early motion in order that function will return as soon as possible.

During the three year period Jan. 1, 1932, to Jan. 1, 1935, there were fifty-five fractures of the patella submitted to open reduction at the Receiving Hospital. As already stated, certain fractures were treated by closed methods. Our records do not show the total number of these but we estimate it to be upward of twenty. In the whole series there were forty-four males and eleven females. Forty-eight were white, six were Negroes, and there was one Oriental. The left patella was involved in twenty-seven, the right in twenty-three, and both patellas in five. The Wassermann reaction was positive in four, negative in forty-five, and not recorded in six. An "automobile accident" was the cause of injury in twenty-six, those riding in an automobile numbering twenty-four, and those being struck by one two. Four were injured in fights or in playing ball, and the remaining twenty-five had a history of a fall.

TABLE 3.—*Summary of Twenty Cases in Which Various Excision Operations Were Carried Out*

Case	Patient	Race	Sex	Age, Years	Observed	Operation	Result
1	S. A.	White	♀	42	.....	Excision	Unknown
2	E. B.	White	♀	58	.....	Excision of upper fragment	Unknown
3	J. B.	White	♂	43	.....	Excision	Unknown
4	G. B.	White	♂	36	24 mos.	Excision	Excellent
5	H. C.	White	♂	51	.....	Excision of upper fragment	Unknown
6	F. D.	White	♂	65	24 mos.	Excision of lower fragment	Excellent
7	F. G.	White	♂	40	.....	Excision	Unknown
8	J. G.	White	♂	36	10 mos.	Excision of upper fragment	Excellent
9	C. H.	Negro	♂	48	.....	Excision of upper fragment	Unknown
10	R. K.	White	♂	43	7 mos.	Excision	Good, improving
11	J. K.	White	♂	18	7 mos.	Excision of lower fragment	Excellent
12	A. K.	White	♂	42	26 mos.	Excision of upper fragment	Excellent
13	P. L.	White	♂	30	7 mos.	Excision	Good, improving
14	E. M.	White	♂	57	.....	Excision of lower fragment	Unknown
15	A. M.	White	♂	27	.....	Excision of upper fragment	Unknown
16	J. N.	White	♂	59	18 mos.	Excision of upper fragment	Excellent
17	A. N.	White	♂	33	7 mos.	Excision	Good, improving
18	C. O.	White	♂	50	.....	Excision	Unknown
19	A. R.	White	♂	39	22 mos.	Excision of upper fragment	Excellent
20	W. W.	White	♂	35	6 mos.	Excision of upper fragment	Good, improving

The age groups are summarized in table 1. A general anesthetic was used in all but four, in whom spinal anesthesia was employed.[10]

Thirty-five of these patients were operated on by various members of the staff with the older methods of bone suture with chromic catgut or kangaroo tendon or merely suture of the capsule. Of these thirty-five, a total of fifteen returned at our request for reexamination and the end results are summarized in table 2.

Although many of the remaining twenty were observed in the outpatient department for varying periods, the end result is listed as unknown because we had not personally examined them. An excellent result was one in which the patient had essentially as useful an extremity as before operation. A good result was one in which the patient was improving with use and had nearly full flexion and only moderate difficulty in getting up and down stairs or in doing his work, if he had any. All other results were fair, there being no instances of over 50 per cent impairment of function but economic usefulness was often considerably diminished, because the patients were laborers. A straight transverse incision was used in fourteen cases, a curved [37] semicircular incision with the concavity downward in nineteen and with the concavity upward in one. A longitudinal incision was used once.

Twenty patients had total or partial excision of the patella; in nine the upper fragment was removed, in three the lower fragment, and in eight a total excision of the patella was done. These cases are summarized in table 3. Eleven of these patients returned at our request for personal examination, the remainder being listed as unknown. A longitudinal incision was used in seven instances, a curved longitudinal incision in six and a transverse semicircular incision with the concavity downward in seven.

Table 4.—*Summary of Cases of Simultaneous Bilateral Fractures of the Patella*

Case	Patient	Race	Sex	Age, Years	Observed	Operation	Result
1	F. D.	White	♂	65	24 mos.	Excision of lower fragment (right) No displacement, cast (left)	Excellent
2	E. J.	Negro	♀	29	.....	Suture capsule (right) Suture capsule (left)	Unknown
3	S. L.	White	♂	50	.....	No displacement, cast (right) Suture capsule (left)	Unknown
4	J. N.	White	♂	57	.....	Kangaroo tendon through fragments (right) Kangaroo tendon through fragments (left)	Unknown
5	A. R.	White	♂	39	.....	Kangaroo tendon through fragments (right) Excision of upper fragment (left)	Excellent

A review of the hospitalization required for these two series showed a substantially shorter time for the patients having excision procedures. This may be accounted for by the fact that we see no advantage in delaying operation, if the skin is clean, beyond from three to four days.[37]

The question of the regeneration of the patella has been of interest in view of our attempts at "patellarplasty." Certain of the roentgenograms of the knees from which the patella had been removed sometime previously showed small scattered areas of calcium density in the region of the patellar ligament and extensor tendon. This was not taken to indicate regeneration of the patella.[38]

The preoperative care of these knees [39] consists simply of immobilization in extension by any means, it being our custom to use a posterior yucca board splint from the toes to the midthigh to prevent further damage to the medial and lateral knee joint capsule.

The following reports of cases are given to illustrate certain points and are typical of the whole series of total and partial excision procedures:

Case 1.—G. B., a white man, aged 36, admitted to the hospital, Nov. 21, 1932, had fallen on his right knee, and radiographic examination revealed a comminuted fracture of the patella with separation of the fragments. At operation, November 26, the patella was removed subperiosteally. There were eleven fragments in all. The extensor tendon and patellar ligament were sutured and the lateral tears in the knee joint capsule repaired. He was given the routine postoperative care and at our request returned, Oct. 27, 1934, at which time he had full, painless flexion and extension, walked up and down stairs normally and worked at hard labor. He could raise himself from a half squatting position with the operated leg alone and he was well satisfied.

The multiplicity of fragments found in case 1 would have almost precluded drilling and suturing. The end result justifies the excision of the patella in this case for markedly comminuted fracture.

Case 2.—P. L., a white man, aged 30, was injured when sliding to base in a ball game, and on radiographic examination of the left knee a transverse fracture of the left patella with marked comminution of the lower fragment was demonstrated. At operation, Oct. 8, 1934, four days following admission, the patella was excised and a "pocket" formed of the peripatellar tissues. The capsule of the knee joint was sutured and a cast was applied. The latter was bivalved and the patient left the hospital nine days after operation with the posterior portion in place and the foot of the cast cut off to permit his wearing a shoe. Tight flannel bandage protection alone was started on the twenty-third day after operation. The patient was reexamined, May 3, 1935, and was found to have full, painless extension against gravity and flexion to 90 degrees. He was working steadily as helper to a truckman. Radiographic examination showed removal of the patella and three small areas of calcification in the region of the patellar tendon.

In this case no regeneration of the patella was found on radiographic examination of the left knee six months after excision, and the disability following fracture of the patella and excision had practically disappeared.

The two reports to follow are presented because they are instances of simultaneous bilateral fracture of the patella,[40] and the patients reported for reexamination at our request (table 4):

Case 3.—F. D., a white man, aged 65, admitted Oct. 12, 1932, had been injured in an automobile accident with fractures of both patellas. Radiographic examination revealed stellate fracture of the left patella without displacement of fragments and comminuted fracture of the right patella with considerable separation of the fragments. Clinically the patient could raise the left leg but not the right. Five days after admission the lower fragments of the right patella were excised and the left leg was put in a cast from the toes to the midthigh. Passive motion to the right knee was started in ten days and active motion three weeks after operation. A flannel bandage about the right knee and the cast on the left leg necessitated the use of crutches during his convalescence. The cast to the left knee was removed at the end of nine weeks. At examination, Oct. 27, 1934, he had full, painless flexion and extension, he walked up and down stairs normally, and both knees were as useful as before operation.

This case illustrates an excellent result of excision of the lower fragment, but we do not now advise this procedure, as we have already stated.

Case 4.—A. R., a white man, aged 39, fractured both patellas in a fight, and radiographic examination revealed transverse fractures of both patellas with marked separation of the fragments. At operation, July 24, 1933, nine days after admission,

37. Bertwistle, A. P.: Notes on Fractured Patella, Lancet **1**: 1349 (June 29) 1929.

38. Grubal, quoted by Speed.[22]

39. Corrigan, F. P.: A Method for Immediate Treatment of Fractured Patella, J. A. M. A. **87**: 408 (Aug. 7) 1926.

40. Steinke, C. R.: Simultaneous Fractures of Both Patellae, Ann. Surg. **58**: 510, 1913.

the upper fragment of the left patella was removed and the fragments of the right patella were drilled longitudinally for the reception of kangaroo tendons and the fragments brought up into apposition. It was felt that this case presented a unique opportunity for testing the efficacy of both the suturing and the excision method. Routine postoperative treatment was carried out relative to the left knee and a walking-iron was incorporated into the cast on the right leg before discharge from the hospital. When examined, May 3, 1935, he had painless motion of both knees and full flexion and extension on the left, 90 degrees flexion and full extension on the right. He went up and down stairs easily and held his body weight on either partly flexed extremity. There was some flexion impairment of the right knee but withal the patient had an excellent result and was well satisfied. Radiographic examination of both knees revealed little of note.

Because fractures of the patella are said not to occur under the age of 20, the following two cases are reported briefly: [41]

CASE 5.—J. K., a white youth, aged 18, fractured the left patella in an automobile accident, and radiographic examination revealed an evulsion type fracture of the lower pole of the left patella with separation of 1 inch (2.5 cm.). At operation, May 3, 1934, some three weeks after admission (the operation was delayed because of the patient's general condition, he having suffered extensive lacerations about the face and the loss of ten teeth), a fragment 2 by 2 cm. was removed from the patellar ligament and the ligament repaired. Routine postoperative care as previously outlined was carried out and when examined, October 27, the patient had full flexion and extension of the affected extremity and he walked up and down stairs normally.

CASE 6.—A. M., a white boy, aged 12 years, fell off a porch, injuring the right knee. Radiographic examination revealed an oblique fracture through the middle of the right patella with slight separation of the fragments. The patient could not raise the right knee off the bed, so injury to the lateral ligaments was suspected and operation was advised. At operation, Dec. 23, 1933, four days after admission, the capsule of the knee joint was found to be intact, and no injury to the patellar capsule was found. The patellar capsule over the fracture site was strengthened with a few interrupted sutures, and a plaster mold was applied. Examination, Oct. 27, 1934, revealed a normal knee function, and the parents were well satisfied.

The study of the method of treating fractured patellas as herein outlined is being continued, and several fresh cases have been treated surgically since Jan. 1, 1935. These have in many instances not been followed for a sufficient length of time, however, to evaluate the end results.

CONCLUSIONS

1. A new conception of the treatment of acute fractures of the patella, total and partial excisions of the patella, is productive of excellent clinical results and is justified in the light of the functional anatomy of the knee joint.

2. When the patella is markedly comminuted, subperiosteal excision is done at once. When there is a sizable distal fragment, the proximal fragment is excised. Excision is the simplest procedure when the distal portion is markedly comminuted.

3. The question of nonunion or of fibrous union of the patella or of adhesions to the femur never arises.

4. The operator may choose his incision provided exposure is adequate to investigate and repair the tears in the knee joint capsule.

5. The length of hospitalization in our series was substantially less than that for the series treated by older methods.

6. The patella does not regenerate following excision.

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41. Eliason, E. L., and Hinton, Drury (collaborator): Fractures of the Patella, in Nelson's Loose Leaf Living Surgery, New York, Thomas Nelson & Sons **3**: 372-374, 1927.

VESICO-INTESTINAL FISTULAS, CAUSED BY FOREIGN BODIES IN THE BOWEL

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The number of cases of vesico-intestinal fistulas reported in the literature is considerable, most of the cases being due to diverticulitis and a malignant condition. A fair number are caused by the rupture of an appendicele or pelvic abscess into the bladder with a resultant fistula. Trauma, serious bowel infections, tuberculosis, actinomycosis, syphilis and bilharziasis play a small rôle in the etiology.

Fistulas between the bowel and the bladder caused by foreign bodies in the bowel are quite unusual.

REVIEW OF THE LITERATURE

In a review of the literature it has been difficult to cull out these cases, owing to the fact that the cause of the fistula is frequently not stated; also in many of them it has been impossible to determine whether the foreign body that produced the fistula was introduced into the bladder or whether it was ingested. There are quite a number of reports of cases in which the fistulas were produced by bladder calculi ulcerating into the bowel, particularly the rectum. These will not be considered in this discussion. Morrissey, in a comprehensive review of the subject of vesico-intestinal fistulas, states that "the location of the opening in the intestinal canal is most common in the rectum, the next most common in the sigmoid and the least are in the small intestine and cecum."

Kingdon [1] in 1842 reported a fistula between the bowel and the bladder, produced by the passage of a needle from the appendix into the bladder. Autopsy showed that a needle was the nucleus of a large stone.

Roberts [2] reported the case of a man, aged 47, from whom a stone was removed by perineal cystotomy. The nucleus of the stone was found to be a piece of a slate pencil which the patient had swallowed six months previously.

McWhinnie,[3] cited by Cripps, reported the case of an old man, a physician, who for nine years had passed gas and occasional feces from the urethra during urination; no urine was passed from the rectum. In April 1849 he had passed a partridge bone by way of the urethra. He had recurrent attacks of intestinal obstruction and died of ileus and secondary peritonitis in 1862, after an illness of many years. In this case the shape of the bone was not described and it might have been introduced into the bladder and produced the fistula.

Guterbock [4] reported a case of gallstones passed in the urine. He made four lithotripsies and removed 13 Gm. of gallstones. The manner in which they reached the bladder was not stated. He cited the case of Faber and Kostlin: A man, aged 35, passed gallstones in the urine at intervals. He died at the age of 62. The gallbladder was connected with the urachus. Kostlin cited a case of G. Pelletan, whose patient,

1. Kingdon, W. D.: Tr. Province M. & S. A., London **10**: 198-202, 1842.
2. Roberts, A.: M. Times & Gaz., London **40**: 113, 1859.
3. McWhinnie, A. M.: M. Times & Gaz., London **1**: 28, 1863.
4. Guterbock: Gallenstein Konkremente in der Hornblase, Virchows Arch. f. path. Anat. **66**: 273, 1876.

aged 26, passed many gallstones in the urine. (Michel, 1909, and McDonald, 1924, also reported finding gallstones in the bladder.)

Fleury [5] described the case of a man with symptoms of vesical stone who was found to have a rectovesical fistula. Gas was passed with the urine. On cystotomy a shoemaker's awl, which was coated with urinary salts, was removed. The awl had been inserted into the bladder fifteen years prior by a companion.

A man, aged 35, with pulmonary tuberculosis, accidentally swallowed a needle 3 cm. long. This passed from the rectum into the bladder so that the head was in the rectum and the point in the bladder. It was coated with phosphatic salts. The patient died of tuberculosis.[6]

Flaubert [7] reported the finding of a bone in the bladder; no details were given.

Harrison [8] reported the case of a man, aged 50, who had had intestinal irritation for several months and had passed feces and gas at each urination for three weeks. A hard tumor the size of a cricket ball was felt in the fundus of the bladder; this proved to be the femur of a rabbit, which had passed from the intestine into the bladder. A bean-sized mass, which was the expanded end of the rabbit's femur, was passed by way of the urethra. He received medical care but the fistula persisted. Harrison also reported the case of a sailor who had symptoms of vesical stone. The whalebone mouthpiece of a pipe was found in the bladder on cystotomy. The patient stated that the pipe stem had been swallowed a long time before; however, since it still had the odor of tobacco, the patient's veracity might safely be questioned.

Benham [9] reported the case of an insane person who inserted an umbrella rib into the urethra, which passed through the apex of the bladder into the duodenum; the part of the rib that was in the bladder was incrusted. No symptoms appeared for two years, and the patient died of peritonitis. Some of the details of this case are lacking.

Arthur [10] reported the case of a woman, aged 45, who had swallowed a pin eleven years before. Great pain developed in the lower part of the abdomen which lasted for several weeks, and there were blood and feces in the urine. Assisted by her husband, the pin was removed from the urethra. A laparotomy was performed, and since it was impossible to separate the uterus, bladder and bowel, the incision was closed. She showed some improvement.

Keen [11] reported the case of a man, aged 24, who had had dysuria since the age of 7 years, at which time the family doctor had removed a pin from the urethra. There was no history of the swallowing or insertion of a pin. At 23 he was thought to have a rectovesical fistula, secondary to the rupture of a prostatic abscess. Two attempts to close the fistula were unsuccessful. A laparotomy was performed, and a long appendix attached to the bladder wall was found; this was separated from the bladder and removed. The patient made an uneventful recovery.

Rautmann [12] reported the case of a multipara, aged 21, who swallowed a hairpin, which was later found in the bladder. This was removed and the patient was cured. The question arises as to whether she swallowed the hairpin or not.

Von Hacker [13] reported the case of a man, aged 51, who had an aerometer pass from the intestine into the bladder, which was later removed. It had been swallowed by the patient five weeks before. Two years later he swallowed a piece of wood, which was likewise removed from the bladder. Here again is the question of the route of entrance into the bladder.

Paul [14] reported the finding of a long cylindric stone in a bladder, the stone having a sewing needle (1.5 cm. long) as its nucleus. The presumption was that the needle had been swallowed and had ulcerated through the intestine into the bladder. This is also doubtful.

Jacomet [15] reported the finding of a pencil 7.5 cm. long, which had been introduced through the anus, in the bladder of a 12 year old child. The patient had a rectovesical fistula. Suprapubic cystotomy was performed, the bladder drained and the patient cured.

Exner [16] reported the case of a woman, aged 54, who was operated on for tumor of the bladder vertex. An inflammatory mass containing a wood splinter 2 cm. long was found; this had perforated from the intestine into the bladder.

Kapsammer [17] operated on a patient for an incrusted tumor mass and found an incrusted bone. One year later he found an incrusted fecal stone in the same place.

Mirabes [18] reported the case of a patient who put a glass tube into the rectum, which wandered into the bladder. This tube was 15 cm. in length and had been used sixteen months previously and left in the rectum. Symptoms of pain and distress developed in the bladder, and pus and blood appeared in the urine. The tube was removed and the patient was cured.

Parham and Hume [19] in a review of the literature on vesico-intestinal fistulas, reported a case in which a pin had been swallowed eleven years before.

Pakowski [20] reported the case of a woman, aged 36, who complained of pain in the bladder of six months' duration. A calculus was found in the bladder, which had formed around one end of a crochet needle; the needle had been introduced three and one-half years before and had perforated through into the intestine. At operation part of the needle was found in the bladder and part in the intestine. There was no gas or feces passed in the urine. The patient was discharged as cured.

Bond [21] reported the case of a sailor in whom the following articles were found in the bladder: from eighty to ninety nails weighing 350 Gm., 20 Gm. of cobblers' nails and carpet tacks, one roofing nail, several pieces of glass three-fourths inch long and one-half inch in width, bits of stone, enamel from a tooth, a

5. Fleury: Bull. Soc. de chir. de Paris **4:** 39, 1878.
6. Dittel: Wien. med. Wchnschr. **31:** 221, 1881.
7. Flaubert: Ueber Knockenfragmente als Fremdkörper in den Harnwegen, Dissertation, Strasbourg, 1881, p. 64.
8. Harrison, Reginald: Liverpool M.-Chir. J. **4:** 1884; Lancet **1:** 287, 1885.
9. Benham: Glasgow M. J., 1886.
10. Arthur, C. S.: Enterovesical Fistula Caused by the Migration of a Swallowed Pin, Fort Wayne M. J. & Mag. **17:** 129-130, 1897.
11. Keen, W. W.: Appendicitis: Urinary Fecal Fistula, Tr. Am. S. A. **16:** 243, 1898.
12. Rautmann: Haarnadel in der Blase, Sitzungsb. d. gynäk. Gesellsch., 1899.
13. von Hacker: Verschluchter Prozentaerometer in der Blase eines Mannes, 1901.
14. Paul, cited by Monaschkin, G.: Ztschr. f. urol. Chir. **19:** 87-94, 1926.
15. Jacomet: Bull. et mém. Soc. de chir. de Paris **30:** 696-699, 1904.
16. Exner: Ein Fall von Entzündung der Blasenwand um einen Fremdkörper, Wien. klin. Wchnschr., 1906.
17. Kapsammer: Blasenstein, dessen Kern ein Huhner Knocken War, Wien. klin. Wchnschr., 1906.
18. Mirabes, cited by Monaschkin, G. B.: Spontaneinwandung eines glasernen Mastdarmrohres in die Blas, Ztschr. f. urol. Chir. **19:** 87, 1926.
19. Parham, F. W., and Hume, J.: Ann. Surg. **50:** 251-286, 1909.
20. Pakowski: Bull. Soc. anat. de Paris **14:** 373-375, 1912.
21. Bond, S. P.: Foreign Bodies in the Bladder, J. A. M. A. **83:** 1163 (Oct. 11) 1924.

carpal bone of a small animal and two 3-inch screws. At autopsy there was found a walled off perforation of the ileum in which eight tacks were found. A recent perforation of the sigmoid into the left side of the bladder was also found. The patient stated that he got drunk and swallowed these articles!

Schwarz [22] reported the case of a female who swallowed a pin, which was removed from the bladder. In 1931 he also reported a case of a crochet needle in a bladder, with a secondary perforation.

Lower and Farrell [23] reported the case of a man, aged 26, who had had a stone with a pin nucleus removed from the bladder in 1925. His mother stated that the pin had been swallowed when he was 6 months old. He had had bladder stones for eight years. Cystoscopic examination revealed an opening in the upper part of the bladder. Lower performed a suprapubic operation and the appendix was found adherent to the dome of the bladder; the vesico-intestinal fistula was in all probability due to the pin swallowed by the patient in infancy, which had lodged in the appendix and perforated into the bladder.

Nesbit and Coller [24] reported the case of a girl, aged 13 years, who ten years prior to entrance into the hospital had had a cystotomy with removal of a bladder stone. A vesico-intestinal fistula was also found. Embedded in the stone was a pin which had caused appendicitis, and the appendix had become adherent to the bladder, ruptured into it and formed the fistula.

These two cases, and those reported by Keen and Kingdon, are the only cases of vesico-intestinal fistulas produced by foreign bodies passing from the appendix to the bladder that were found.

In all probability the twenty-eight cases reviewed here do not represent every case of foreign body producing vesico-intestinal fistula, but the review is helpful not only in showing that the condition is uncommon but also in giving one an idea of the various ways in which foreign bodies produce this condition.

REPORT OF CASE

To these reported cases we add a somewhat detailed report of a case in the urologic service of the Presbyterian Hospital.

A man, aged 65, for six months prior to admission had been disturbed by frequency and urgency, having to urinate about every hour, day and night. This was associated with severe pain in the lower part of the abdomen and pain in the bladder at the end of urination. He had repeated attacks of chills and fever. The urine was cloudy and often contained blood. He had lost about 35 pounds (16 Kg.) in the past six months. He never had had any roaring in the bladder or escape of gas from the urethra. A large fixed mass, about the size of a grapefruit, could be palpated in the median line above the pubis. The prostate was only moderately enlarged, grade 1, soft, smooth, symmetrical and not fixed. There was no residual urine. The urine was found crowded with pus and blood and on culture grew gram-negative rods and gram-positive cocci, and the plate was overgrown with Bacillus proteus. The blood chemistry was normal, the phenolsulfonphthalein output was 87 per cent in two hours, and the Wassermann reaction was negative. A flat plate of the urinary tract showed slight lipping of the lumbar spine but otherwise was negative.

A cystogram showed a slightly irregular outline of the bladder and multiple phleboliths. Fluoroscopy of the chest was negative. A barium sulfate enema and fluoroscopy showed that a column of barium entered the rectum and rectosigmoid rapidly. In the middle of the sigmoid a filling defect was seen with a small channel leading from the margin of the intestine, suggesting a fistulous tract. Films confirmed the fluoroscopic observations. Examination of washings from the bladder following the barium enema was negative for barium sulfate.

On cystoscopic examination the bladder was markedly injected throughout. There was only a slight intrusion of the prostate into the bladder. A foreign body was seen lying on the floor of the bladder, which was about 4 cm. in length, 0.5 cm. in width, pointed at one end and black. When grasped with a rongeur forceps pieces broke off, but we finally succeeded in removing it. On examination it was found to be vegetable matter.

A brown spot was seen on the posterior wall of the vertex of the bladder. This was surrounded by an edematous area, and a small depression was seen in the center, the usual appearance of the bladder end of a vesico-intestinal fistula.

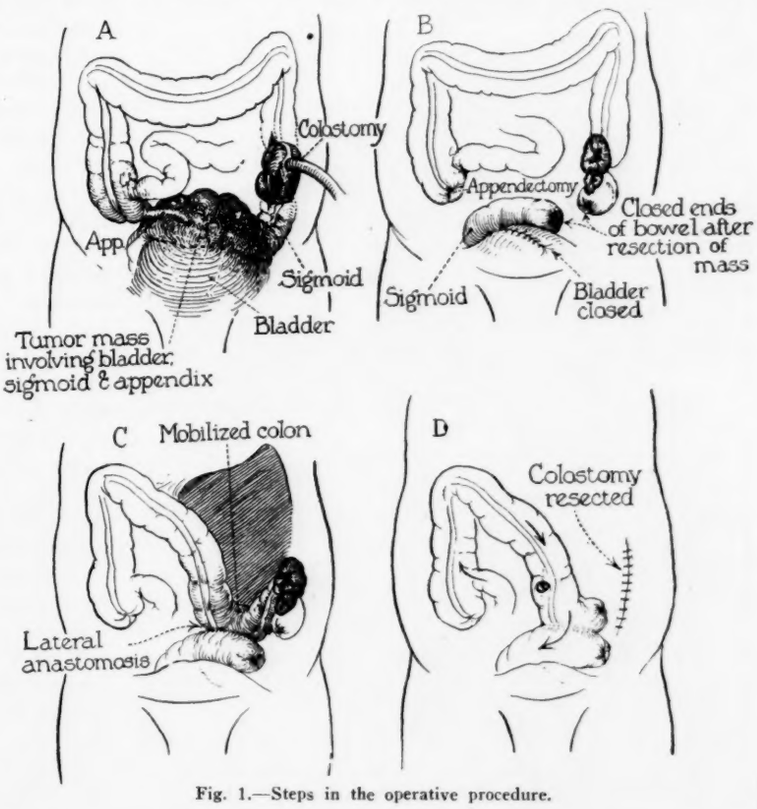

Fig. 1.—Steps in the operative procedure.

Attempts to pass a catheter into the center of this area failed. Sodium iodide solution introduced into the bladder could not be visualized in the intestine.

Before we approached this case surgically we were uncertain as to the nature of the pathologic condition but considered it most likely a carcinoma of the sigmoid colon or a chronic diverticulitis. The loss of 35 pounds and the nodular feel of the large suprapubic mass suggested a malignant growth, but the general well being of the patient, the absence of blood in the stools and the presence in the x-ray film of small diverticula spoke very strongly for a chronic benign process.

June 13, 1934, the abdomen was opened through a left paramedian incision and thoroughly exposed. There was a firm nodular tumor mass the size of a man's two fists involving the sigmoid colon and the dome of the urinary bladder, and firmly adherent to its wall were several loops of small intestine and a large thick-walled appendix. It had the gross appearance and feel of a carcinoma, yet it was not possible to be sure that it was not a diverticulitis, because the liver was smooth and no enlarged glands could be felt in the mesentery. It seemed questionable whether the mass was resectable, but in view of the severe contamination of the urinary tract a clear indication

22. Schwarz, in discussion on Perlmann, S.: Ztschr. f. Urol. **21**: 42, 1927.
23. Lower, W. E., and Farrell, J. I.: Ann. Surg. **93**: 628 (Feb.) 1931.
24. Nesbit, R. M., and Coller, F. A.: Am. J. Surg. **25**: 536-538 (Sept.) 1934.

existed for sidetracking the fecal current above this level. Through a separate muscle-splitting incision, therefore, a left inguinal colostomy was made and the rectus incision closed. Figure 1 *A* illustrates diagrammatically the situation at the close of the first operation.

The patient recovered nicely from this procedure, and his progress was rapid. The colostomy functioned well, the urine cleared rapidly, and his appetite improved steadily. July 30 (six weeks after the first operation) the abdomen was reopened through a right paramedian incision. The adherent loops of intestine were easily separated, and a resection of this large tumor mass was carried out, including with it the appendix and upper third of the bladder. The opening in the bladder was closed with a double row of catgut, the sigmoid colon just distal to the tumor was closed with a purse string, and the resection carried proximally almost up to the colostomy. Figure 1 *B* represents the operative field at the closure of the second procedure. When the specimen was opened after removal, much to our surprise the tumor was found to be made up of a chronic, very thick-walled fistulous tract between

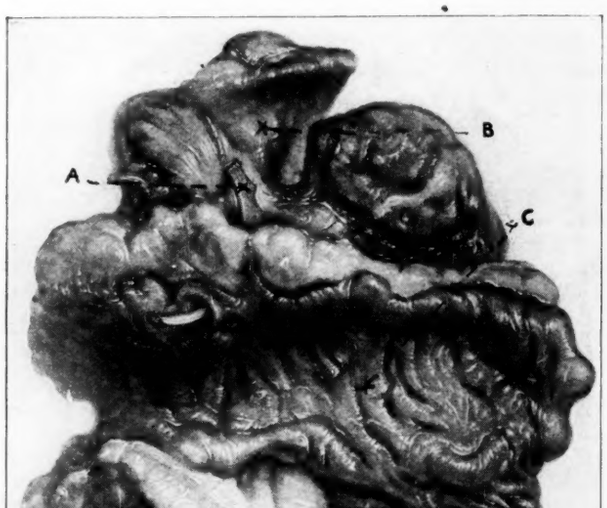

Fig. 2.—Appearance of tumor of sigmoid with communication with the bladder, caused by a chicken bone: *A*, bone; *B*, bladder; *C*, sigmoid colon.

the sigmoid and the bladder, and in this tract lay a large curved, sharp pointed chicken bone (fig. 2). There was no evidence of malignancy and there seems little doubt that a diverticulum had originally been the lodging point for this foreign body. From there it had slowly worked its way into the bladder.

About five weeks later, September 6, the patient was operated on for the third time, the object being to reestablish the continuity of the large intestine and perhaps get rid of the colostomy opening.

Consequently the abdomen was opened again through the original left paramedian incision, which was extended well above the umbilicus. The entire descending colon down to the colostomy and the left half of the transverse colon were mobilized (fig. 1 *C*) by dividing the outer half of the mesentery so as to permit a lateral anastomosis between that part of the descending colon just proximal to the colostomy and the sigmoid colon, which originally lay just distal to the tumor mass. Recovery after this operation was, as after the two previous, uneventful.

On October 1, three and one-half months after the first operation, the final chapter in this interesting clinical drama was written; namely, the closure of the colostomy (fig. 1 *D*). This involved resection of the entire part of the intestine involved in the colostomy itself and the short stump distal to it and as far proximally as the site of the lateral anastomosis, in order to avoid leaving a fluid pocket at this point.

The end result, as judged by the appearance of the patient one year after his dismissal from the hospital, has been most pleasing both to the surgeons and to the patient himself.

COMMENT

In a careful study of the reviewed cases it was very difficult in many instances to determine the origin of the foreign body: (1) whether it traveled by way of the gastro-intestinal tract and for some reason hesitated in a portion of the bowel, (2) whether it became lodged in a diverticulum causing an inflammatory reaction with adhesion to the bladder wall and finally ulcerating through, or (3) whether the foreign body was introduced into the bladder through the urethra and ulcerated through the bladder wall, involving the wall of the intestine and in this way producing a fistula.

Considering the large number of foreign bodies found in the bladder, including stones which cause little or no change in the bladder wall, it is quite evident that the production of a fistula in this way is not very common.

The symptoms of foreign body vesico-intestinal fistulas do not differ very much from those of fistulas due to other causes. In addition to the striking symptoms of passage of gas and feces through the urethra and roaring in the bladder, the frequency, urgency, pain and strangury are more marked in cases presenting a foreign body. Again, these patients are likely to have more aggravated intestinal symptoms, which may precede those of the bladder.

When infection from the bladder spreads to the upper urinary tract, symptoms produced by renal infection appear, chills, fever, pain in the back, and, if the parenchyma becomes involved, the symptoms of renal damage may present themselves.

The presence of urine in the bowel movements is not as common in vesico-intestinal fistulas as some would believe, and it would seem that the intestinal contents, gas and feces, may pass into the bladder without a reverse flow of urine into the intestine. This is shown also by the fact that it is not often possible to visualize the intestine by injecting a contrast fluid into the bladder. The exception to this occurs in those cases in which a severe cystitis has developed with the production of a small thick-walled compensated bladder associated with increased intracystic pressure. This is true also in cases in which the condition is complicated by some form of obstruction of the lower urinary tract. Under these circumstances urine is likely to be found in the bowel movements.

We have been able to visualize the intestine a few times by passing a ureteral catheter into the bladder end of the fistula and injecting sodium iodide.

The preoperative diagnosis of vesico-intestinal fistula with present-day urologic methods is not difficult. The diagnosis of the cases produced by foreign bodies may not offer much difficulty if the foreign body can be found in x-ray films or seen with a cystoscope. In our case this was not possible. The chicken bone that produced the fistula was surrounded by a very large inflammatory mass involving the intestine and failed to show in the x-ray film. The part of the bone that lodged in the wall of the bladder did not protrude into the bladder and could not be seen with a cystoscope.

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COMPRESSION OF THE CAUDA EQUINA BY THE LIGAMENTUM FLAVUM

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The diagnosis of compression of the lumbosacral roots of the spinal cord following injury is sometimes quite difficult. The usual classic sequence of root pain, loss of motion and sensation, vesical or rectal incontinence and absent reflexes does not prevail in each case. The symptoms of root pain which is accentuated by lying on the back or on exertion should lead to a suspicion of compression of the cord. Hypertrophy of the ligamentum flavum in the lumbar region has been described on only three occasions.

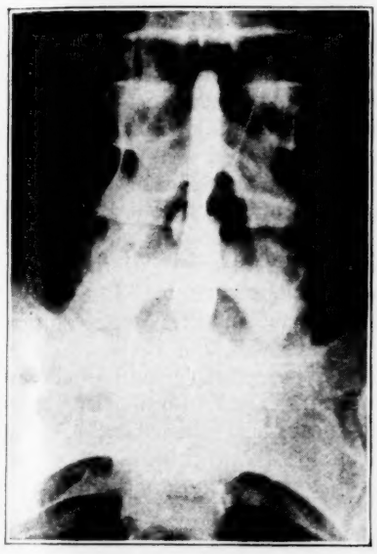

Fig. 1.—Defect between the fourth and fifth lumbar vertebrae on the left, indicative of a space-occupying lesion in this region.

The case reported by Elsberg,[1] cited the instance of a woman, aged 39, who was thrown from a car ten months prior to her operation. She suffered from stiffness of the back, with pain over the distribution of the fourth lumbar root on the left side. Roentgenograms revealed an old fracture and thickening of the arches of the fourth and fifth lumbar vertebrae. On performing a laminectomy, he found a thickened ligamentum flavum, lateral and posterior to the dura, which involved the fourth lumbar root. Apparently the ligament had been torn loose. Removal of this ligament was followed by complete recovery.

Towne and Reichert[2] reported two cases of compression of the lumbosacral roots of the spinal cord by thickened ligamenta flava.

One case reported was that of a laborer, aged 50, who may have received minor back injuries; the other was that of a housewife, aged 32, from whom no history of injury was obtainable. In both instances relief of pain was obtained by removal of the thickened ligamenta flava.

ANATOMY

The ligamenta flava stretch across the posterolateral aspect of the spinal canal between the laminae. The ligaments, composed of yellow elastic tissue, are attached to the anterior aspect of the superior laminae and posterior surface of the inferior. The two ligaments of each interlaminar space fuse in the midline and extend laterally to form the posterior margin of the intervertebral foramina. The ligament, as normally observed during laminectomy, is 1 or 2 mm. thick and yellow.

REPORT OF CASE

A young woman, aged 23, single, was referred to me, Oct. 29, 1935, because of pain in the left buttock radiating down the distribution of the left sciatic nerve.

In April 1935, in alighting from a car, she tripped and fell, landing on the left buttock and suffering a very severe contusion.

In July she began to complain of a dull backache in the region of the lumbar vertebrae. Roentgenograms of the spine at that time were negative and her family physician made a diagnosis of sacro-iliac strain. She achieved relief from pain by wearing a sacro-iliac belt. However, in August pain began to develop in the left posterior thigh and leg to the heel, occurring particularly at night, so that she was unable to lie on her back or her left side. The pain was also accentuated by coughing, sneezing, straining or stooping. In walking she noted a tendency to shift her weight to the right.

General physical examination was negative, including laboratory tests of the blood and urine.

Neurologic examination, October 29, was essentially negative. The possibility of a cord lesion developing was considered but, in the absence of symptoms, an epidural injection was performed, October 31. After 20 cc. of procaine hydrochloride had been injected into the caudal foramen, the pain was markedly increased. A total of 60 cc. of 1 per cent procaine hydrochloride was injected. She received no benefit and the injection was repeated in a week with no relief from pain. The pain became so severe that the administration of codeine was necessary to obtain relief.

December 16 she complained of a sense of numbness in the left leg. There was no change in sensation but the left patellar reflex was absent. The left achilles reflex was present.

Jan. 29, 1936, the neurologic status remained the same, except that the left achilles reflex was diminished. A spinal puncture and injection of lipoiodine was advised because of the history of injury, the severe pain and absence of definite neurologic signs. It was felt that the patient had suffered a rupture of the intervertebral disk with a hernia of the nucleus pulposus into the canal.

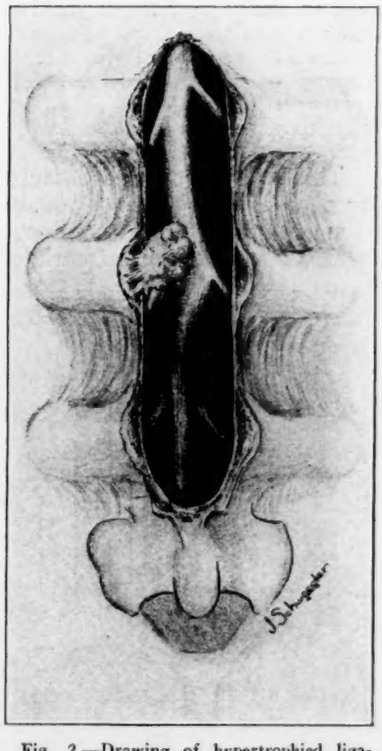

Fig. 2.—Drawing of hypertrophied ligamentum flavum as found at operation.

February 3 she was admitted to Mercy Hospital, and needles were inserted between the twelfth dorsal and first lumbar vertebrae and between the fourth and fifth lumbar vertebrae. Two manometers were attached; the upper manometer registered 9 cm. of water and the lower manometer 6.5 cm. of water. On jugular compression, coughing and straining, fluid in the upper manometer rose to 15 cm. in the lower to 7.5 cm. Specimens of fluid were taken at each level; there was no excess of globulin in the upper one but there was an excess of globulin, 2 plus, in the lower one. The Wassermann test of the cerebrospinal fluid was negative. Then 5 cc. of lipoiodine was injected into the canal at the upper level. The patient was tilted on the fluoroscopic table and a narrowing of the lipoiodine was noted as it coursed between the fourth and fifth lumbar vertebrae, with a tendency for the fluid to go to the right. Roentgenograms revealed a defect between the fourth and fifth lumbar vertebrae suggestive of a hernia of the intervertebral disk on the left. A diagnosis of rupture of the intervertebral disk with compression of the cord was made, and laminectomy was advised.

From the Department of Neurosurgery, Mercy Hospital.

1. Elsberg, C. A.: Experiences in Spinal Surgery, Surg., Gynec. & Obst. **16**: 117-132 (Feb.) 1913.
2. Towne, E. B., and Reichert, F. L.: Compression of the Lumbosacral Roots of the Spinal Cord by Thickened Ligamenta Flava, Ann. Surg. **94**: 327-336 (Sept.) 1931.

February 26, under tribrom-ethanol anesthesia, a laminectomy was performed. The spinous processes and laminae of the third, fourth and fifth lumbar vertebrae were removed. There was a mass of hard fibrous material 2 by 2 by 1.5 cm. posterior and lateral to the cord at the level of the fourth lumbar interspace on the left. This compressed the cord and was adherent to the dura. It was noted that the dura below was a dark blue and that it did not pulsate. When this mass was divided it was found that a nerve root was embedded in the mass; it was freed without gross damage to the root. The mass seemed to originate from the lamina of the fourth lumbar vertebra. After removal of this mass the cord pulsated freely and the color was normal.

Fig. 3.—Tissue removed at operation, illustrating groove through which fourth lumbar root ran.

The dura was opened and the lipoiodine that had been injected previously was removed. No pathologic change in the cauda was noted. The dura was closed with continuous silk sutures; the muscles were closed with interrupted catgut sutures, and the skin with dermal reinforced with silkworm-gut sutures. There was no drainage.

The pathologist reported that the tissue removed consisted of yellow elastic and fibrous tissue. Recovery was uneventful and the patient was dismissed sixteen days after operation. There was no weakness of the extremities, sensation was intact, all reflexes were present, and pain was entirely relieved.

March 25 the patient stated that she was driving a car, walking one or two miles daily, had attended a dance without recurrence of pain, and to all appearances had recovered completely.

SUMMARY

This case is reported because of the persistence of root pain with a paucity of demonstrable objective changes. However, in the event of progression of symptoms, spinal manometric readings and injections of lipoiodine are justified to determine the existence of an underlying pathologic process which may be removed before severe damage to the nerve roots has taken place. This case illustrates the rôle of antecedent trauma in which the ligamentum flavum was torn and, in the reparative process, scar tissue had caused a compression of the cord.

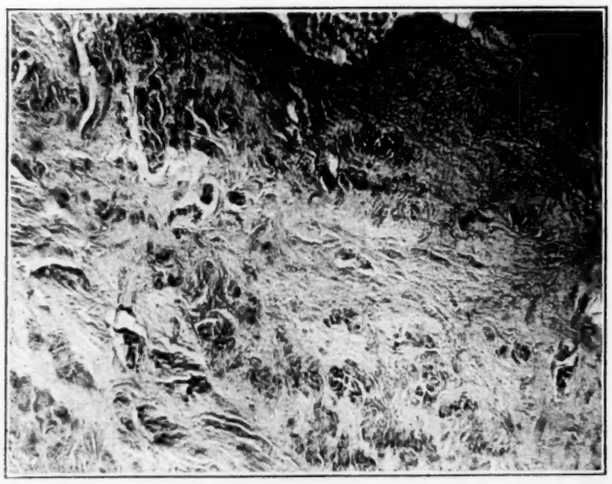

Fig. 4.—Thickened ligamentum flavum stained with eosin and hematoxylin; reduced from a photomicrograph with a magnification of 100 diameters.

405 Sixth Avenue.

LATE TOXIC RESULTS, INCLUDING DERMATITIS EXFOLIATIVA, FROM "SLIM" (DINITROPHENOL)

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AND
W. F. SCHWARTZ, M.D.
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The pharmacologic actions of the nitrophenols [1] have been known since 1885, when it was found that these compounds possess the property of elevating the metabolic rate in animals. However, the effect of this chemical group on human beings was not generally recognized until the late war. At this time Perkins' [2] investigations on munitions workers in France focused attention on its many toxic reactions.

The therapeutic possibilities of these chemicals apparently were not utilized until 1933, when Cutting, Mehrtens and Tainter [3] introduced dinitrophenol as a treatment for some forms of obesity. They were fully aware of the many potential dangers of this drug and in their original series of cases encountered only mild and transient reactions, perhaps because of the conservative dosage and stringent observation.

From the available reports of toxic manifestations to Jan. 1, 1936, it appears that the early reactions, except in the occasional hypersensitive individual, tend to be mild and transient. These familiar reactions include headache, mild chest pains and backache, excessive sweating and feeling of warmth, night sweats, lassitude, nervousness, tachycardia and palpitation, lowering of the blood pressure, vertigo, pharyngitis and otitis media, abdominal pain, derangement of taste, toxic hepatitis with jaundice, maculopapular erythema, urticaria, edema, purpura and extreme pruritus.[4]

Attempts to predetermine individual hypersensitivity to dinitrophenol have been unconvincing.[5] For this reason it is apparently impossible, at present, to foretell a very serious reaction to even a small amount of the drug. In all, seven fatalities from dinitrophenol and one from dinitrocresol have been reported. Two [6] of these were attributed to a definite overdosage, while

From the service of Dr. H. N. Cole and Dr. J. R. Driver, Division of Dermatology, Cleveland City Hospital, and the Department of Dermatology and Syphilology, Western Reserve University, School of Medicine.

1. Cazeneuve and Lépine: Compt. rend. Acad. d. sc. **101:** 1167, 1885.
2. Perkins, R. G.: Pub. Health Rep. **34:** 2335 (Oct. 24) 1919.
3. Cutting, W. C.; Mehrtens, H. G., and Tainter, M. L.: Actions and Uses of Dinitrophenol, J. A. M. A. **101:** 193 (July 15) 1933.
4. These references include:
Anderson, Reed and Emerson.[12]
Tainter, Stockton and Cutting.[12]
Dintenfass.[17]
Hirsch, Sidney: Report of a Toxic Manifestation Due to "Dinitrenal," correspondence, J. A. M. A. **102:** 950 (March 24) 1934.
Frumess.[5]
Jackson, Harry, and Duvall, A. I.: Dinitrophenol Poisoning: Report of a Case, ibid. **102:** 1844 (June 2) 1934.
de Châtel and Motika.[14]
Bohn.[10]
Sidel, Nathan: Dinitrophenol Poisoning Causing Jaundice: Report of Case, J. A. M. A. **103:** 254 (July 28) 1934.
Haft, H. H.: Toxicity of Dinitrophenol, correspondence, ibid. **101:** 1171 (Oct. 7) 1933.
Matzger.[5]
Beinhauer, L. G.: West Virginia M. J. **30:** 466 (Oct.) 1934.
Vanore, A. R.: M. Times & Long M. J. **62:** 347 (Nov.) 1934.
Nadler.[12]
Tainter, M. L.; Stockton, A. B., and Cutting, W. C.: Dinitrophenol in the Treatment of Obesity, J. A. M. A. **105:** 332 (Aug. 3) 1935.
Noun, M. H.: Urticaria, Edema and Purpura Following Small Doses of Dinitrophenol, Arch. Dermat. & Syph. **32:** 288 (Aug.) 1935.
Epstein and Rosenblum.[12]
5. Frumess, G. M.: Allergic Reaction to Dinitrophenol, J. A. M. A. **102:** 1219 (April 14) 1934. Matzger, Edward: Can Sensitivity to Dinitrophenol Be Determined by Skin Tests? ibid. **103:** 253 (July 28) 1934. Eisner, E.: Zentralbl. f. Gewerbehyg. **9:** 81 (April) 1932.
6. Geiger, J. C.: A Death from Alpha-Dinitrophenol Poisoning, correspondence, J. A. M. A. **101:** 1333 (Oct. 21) 1933. Tainter, M. L., and Wood, D. A.: A Case of Fatal Dinitrophenol Poisoning, ibid. **102:** 1147 (April 7) 1934.

four of them [7] occurred in persons who had taken an amount within the "therapeutic range" and perhaps represent allergic responses. The remaining two fatalities [8] can be accounted for by complicating agranulocytosis.

It appears that a moderate amount of this drug must be taken before a neutropenia is produced. However, Hoffman, Butt and Hickey [9] reported a case developing after a total amount of 86 grains (5.6 Gm.) had been taken over a period of only fourteen days. In the remaining five cases [10] the average ingestion of dinitrophenol was 184 grains (12 Gm.) over a period of fifty-eight days.[11]

Thirty cases of polyneuritis can be found officially reported in the literature.[12] This includes a rather large number showing solely, or in combinations, aberrations of taste which have been interpreted as neuritis. Many cases have shown multiple regional involvement, but the feet and legs are the sites of predilection (stocking type seventeen, glove type ten and derangement of taste eight). Owing to the incompleteness of some reports it is impossible to determine the exact time that elapsed between the beginning of the treatment and the appearance of the neuritic symptoms. From those reports in which this factor was recorded it is found that the average time was at least ten weeks and the dosage apparently was well within the "therapeutic range." There was decidedly a wide variation in the duration of the symptoms, but subsidence within from weeks to months was the rule.

Of the many side actions of dinitrophenol, the rapidly developing cataracts have attracted the widest attention. The literature shows definite reports of fourteen bilateral cataracts,[13] and many of the writers mention additional ones of which they have knowledge. The shortest time reported for the appearance of this complication was three months and the longest eighteen months, with an average of nine months from the time the drug was first taken. The smallest total amount of dinitrophenol taken in these cases was 135 grains (9 Gm.) and the largest 1,900 (123.5 Gm.), with an average total dose of approximately 870 grains (56.5 Gm.). No case has shown spontaneous resolution and most have progressed to complete opacity within about three months.

Little emphasis has been given to the possibility that dinitrophenol may be cardiotoxic. Apparently there are no lasting or significant alterations in pulse rate, blood pressure or cardiac auscultatory manifestations. Electrocardiographic studies on patients under the effects of this drug are few, there being a total of only five such cases in the literature. These were reported by de Châtel and Motika [14] and by MacBryde and Taussig.[15] The five patients thus studied received an acceptable dosage with close observation and yet showed definite alterations of the electrocardiogram in as early as two weeks. Although the period of follow-up was not prolonged, the original changes persisted for as long as ten weeks even after the discontinuance of the drug for a period of two weeks. It is noted by these authors that all the tracings, even those obtained from experimental animals, were quite similar and probably represented a myocardial dysfunction, as evidenced chiefly by alterations in the T wave.

These later and more severe sequelae are well illustrated by a patient who demonstrated a combination of several of them and whose history is here given:

REPORT OF CASE

History.—Mrs. G. L., a Jewess, aged 33, admitted to the Cleveland City Hospital Nov. 29, 1935, complained of an extremely pruritic generalized skin eruption, which had been present for eight months. The patient stated that before that time she "had never had any skin trouble." For the two weeks prior to the onset of the presenting complaint she had been taking 2 grains (0.13 Gm.) of dinitrophenol [16] daily, 28 grains (1.8 Gm.) in all. Even before she finished taking the dinitrophenol she began to notice a generalized pruritus, and two or three days later several small erythematous patches appeared on the face and back. New lesions continued to appear on various parts of the body and the older ones progressed to become confluent. The family and past histories were irrelevant.

Physical Examination.—On admission the patient was fairly toxic but ambulatory. The temperature was 37 C. (98.6 F.), pulse rate 95, respiratory rate 20, and the blood pressure 122 systolic and 80 diastolic. Practically the entire body surface, including the palms, soles and scalp, showed variously shaped, slightly scaly, beefy red, discrete and confluent patches measuring up to about 20 cm. in diameter. Many of the areas were desquamated and quite raw. Very little of the body surface was exempt. No mucous membrane lesions were found. The eyes and ears were normal, and the remainder of the physical examination was essentially negative.

Hospital Course.—The eruption continued to spread and within a few weeks became universal. One month after admission the patient developed a severe classic exfoliating dermatitis with redness and edema of the skin, oozing of serum, universal scaling and crusting, and loss of hair and nails with signs of toxicity and fever. Pruritus became very distressing. Moderate edema of the hands and feet was noted. Painful and disabling cutaneous contractures developed in the palms and popliteal and cubital spaces. Despite the use of many and varied soothing antipruritic and antiseptic remedies, practically no modification in the character of the violent skin reaction was effected until the past few weeks, when possibly there has been some slight improvement. The oozing and edema of the skin have subsided somewhat. For about three months following the development of the exfoliating dermatitis the patient had an unexplained spiking temperature between 35.5 and 39.5 C. (95.9 and 103.1 F.), which, since that period, has become normal. The pulse rate remained between 90 and 100 throughout, and the blood pressure did not vary.

On or about the fortieth hospital day she began to complain of difficulty in hearing and of pain and burning sensations in the hands and forearms. Because the remainder of the body was pruritic, the possibility of polyneuritis was considered. A neurologic consultant reported: "So much of the skin tissues

7. Correspondence: Lancet **1:** 489 (March 3) 1934. Masserman, J. H., and Goldsmith, Harry: Dinitrophenol, J. A. M. A. **102:** 523 (Feb. 17) 1934. Poole, F. E., and Haining, R. B.: Sudden Death from Dinitrophenol Poisoning, ibid. **102:** 1141 (April 7) 1934. Lattimore, J. L.: J. Kansas M. Soc. **35:** 388 (Oct.) 1934.

8. Dameshek, William, and Gargill, S. L.: New England J. Med. **211:** 440 (Sept. 6) 1934. Silver, Solomon: A New Danger in Dinitrophenol Therapy, J. A. M. A. **103:** 1058 (Oct. 6) 1934.

9. Hoffman, A. M.; Butt, E. M., and Hickey, N. G.: Neutropenia Following Aminopyrine, J. A. M. A. **102:** 1213 (April 14) 1934.

10. Bohn, S. S.: Agranulocytic Angina Following Ingestion of Dinitrophenol, J. A. M. A. **103:** 249 (July 28) 1934. Dameshek and Gargill.[8] Silver.[8] Hoffman, Butt and Hickey.[9]

11. Since January 1, two additional cases of agranulocytosis from dinitrophenol have been reported: Imerman, S. W., and Imerman, C. P.: Dinitrophenol Poisoning, J. A. M. A. **106:** 1085 (March 28) 1936.

12. Anderson, H. H.; Reed, A. C., and Emerson, G. A.: Toxicity of Alpha-Dinitrophenol, J. A. M. A. **101:** 1053 (Sept. 30) 1933. Tainter, M. L.; Stockton, A. B., and Cutting, W. C.: Use of Dinitrophenol in Obesity and Related Conditions, ibid. **101:** 1472 (Nov. 4) 1933. de Châtel and Motika.[14] Nadler, J. E.: Peripheral Neuritis Caused by Prolonged Use of Dinitrophenol, J. A. M. A. **105:** 12 (July 6) 1935. Tainter, Stockton and Cutting.[13] Epstein, E., and Rosenblum, H.: J. Lab. & Clin. Med. **20:** 1118 (Aug.) 1935. Cogan, D. G., and Cogan, Frances C.: Dinitrophenol Cataract, J. A. M. A. **105:** 793 (Sept. 7) 1935.

13. Tainter, Stockton and Cutting.[4] Cogan and Cogan.[12] Horner, W. D.; Jones, R. B., and Boardman, W. W.: Cataracts Following the Use of Dinitrophenol, J. A. M. A. **105:** 108 (July 13) 1935. Shutes, M. H.: Am. J. Ophth. **18:** 752 (Aug.) 1935. Kniskern, P. W.: Cataracts Following Dinitrophenol, J. A. M. A. **105:** 794 (Sept. 7) 1935. Lazar, N. K.: Cataract Following the Use of Dinitrophenol, ibid. **105:** 794 (Sept. 7) 1935. Allen, T. D., and Benson, V. M.: Late Development of Cataract Following Use of Dinitrophenol About a Year Before, ibid. **105:** 795 (Sept. 7) 1935. Glowacki, B. F.: J. Michigan M. Soc. **34:** 535 (Sept.) 1935.

14. de Châtel, A., and Motika, J.: Deutsches Arch. f. klin. Med. **176:** 700, 1934.

15. MacBryde, C. M., and Taussig, B. L.: Functional Changes in Liver, Heart and Muscles, and Loss of Dextrose Tolerance, J. A. M. A. **105:** 13 (July 6) 1935.

16. "Slim," a proprietary preparation containing "1 grain [0.065 Gm.] of dinitrophenol" per capsule.

are involved in this violent reaction that the nerve endings must be badly distorted in receptive function. One can only diagnose a polyneuritis by induction. The deafness may be otitic in origin; i. e., a reactive exudation in the middle ear rather than a nerve impairment." These localized paresthesias persisted practically unchanged for about two months, after which they began to subside.

Also on about the fortieth hospital day (nine and one-half months after the ingestion of the dinitrophenol), the patient first noticed a blurring of her vision. Several days later the ophthalmologists saw the patient and diagnosed "bilateral incipient cataracts." They observed the course of this complication and at the time of this report "there has been no evidence of progression in the lens opacities."

General therapy consisted of injections of hypertonic dextrose, sodium dehydrocholate and sodium thiosulfate intravenously. The last has also been given orally. Liver extract was given intramuscularly. The patient has been on a high caloric diet and 5 units of insulin daily for the past three months. The recent slight improvement that the patient has enjoyed cannot be attributed to any one of the foregoing procedures.

Laboratory Examination.—Consistent with a dermatitis exfoliativa, a Prausnitz-Küstner test with "Slim" was negative. The Marsh test on a capsule and its contents was negative for arsenic. The icteric index was 5 and 12 on two occasions; the blood cholesterol was 78 mg. per hundred cubic centimeters; two blood sugar determinations were 46 and 64 mg. per hundred

Intense exfoliation and crusting type of dermatitis at the end of ten and one-half months.

cubic centimeters. The blood urea nitrogen was only 7 mg. per hundred cubic centimeters. A urea clearance test was done with no evidence of renal damage; a phenolsulfonphthalein excretion test, however, showed slight retention, 55 per cent after two hours. Repeated urine examinations were negative for albumin and formed elements. Four blood studies were done with no evidence of agranulocytosis or other blood dyscrasia. There was, however, a slight secondary anemia. The basal metabolic rate was only plus 3. Two electrocardiograms at an interval of two weeks (about one year after the ingestion of the dinitrophenol) were somewhat conflicting and showed but little evidence of definite abnormality. In one, however, there was slight evidence of myocardial damage or dysfunction (low voltage QRS, leads 1 and 3; low voltage T, lead 3). The other showed left axis deviation with increased T wave in leads 1 and 2 but very low voltage T in lead 3.

COMMENT

Although combinations of toxic reactions to dinitrophenol have often been reported, the marked multiplicity, severity and tardiness of those shown by this case are remarkable. The most striking manifestation that this patient presented was her violent cutaneous reaction. Its appearance and course have been so similar to the exfoliative dermatitis seen following therapy with the arsphenamines that the close basic chemical relationship between that group and dinitrophenol immediately suggests itself. This relationship has been mentioned several times in the reports of those cases of agranulocytosis developing from dinitrophenol. A careful search of the literature fails to reveal a previous case showing dermatosis of such chronicity or degree of exfoliation as that exhibited by this patient. In view of the frequent occurrence of the early cutaneous reactions to this drug it is surprising that some have not progressed to the type reported here.

When the pain and burning sensations of the hands and forearms first appeared, a definite interpretation could not be made. However, the subsequent course has been such that a final diagnosis of polyneuritis is justified. The manifestations of this late complication seen here vary in no respect from those previously reported.

The temporary deafness from which this woman suffered was due to an exudative otitis media and apparently is of the same nature as that reported by Dintenfass.[17]

The cataracts observed here are at variance in two major respects with those previously described. In the first place they developed from an unusually small amount of the drug, and in the second place throughout the period of observation they have remained as minimal opacities. The resulting slight visual impairment would probably have escaped the patient's notice had it not been that she was under hospital observation. This suggests the possibility that other persons with a similar degree of impairment have not sought medical aid.

Electrocardiographic studies of the effects of dinitrophenol on the heart are so few that no definite conclusions can be drawn. That myocardial changes do occur and can be demonstrated electrocardiographically is shown by the few existing reports,[18] and that these changes may persist is at least suggested by the case at hand. It is, however, unfortunate that earlier tracings were not made. This interesting evidence of a possible severe and persistent complication from the use of dinitrophenol should be borne in mind and warrants further consideration.

SUMMARY

The case here presented shows a multiplicity of severe and persistent reactions, including exfoliating dermatitis thus far not reported, cataracts and polyneuritis following the ingestion of only 28 grains of dinitrophenol over a period of fourteen days.

17. Dintenfass, Henry: An Ear Complication from Dinitrophenol Medication, J. A. M. A. **102**: 838 (March 17) 1934.
18. de Châtel and Motika.[14] MacBryde and Taussig.[15]

Yellow Fever and Geography.—Yellow fever had a marked effect on the "geographic expansion of the United States." In the latter days of the eighteenth century Napoleon sent a large body of troops under his brother-in-law, General LeClerc, to Santo Domingo and Haiti. It was Napoleon's plan after he had overrun those countries in the West Indies to send his troops on from there and occupy in force the Floridas and the territory of Louisiana on the American continent. However, as a result of yellow fever LeClerc's troops were practically decimated and became so debilitated and reduced in physical and numerical strength that his plans failed and he had to relinquish his intentions regarding the western hemisphere. Therefore in 1803 Napoleon was very glad to sell to the United States the territory of Louisiana known to us as the famous "Louisiana Purchase," whereby our country acquired a region which now comprises fourteen states of the Union. Had Napoleon's plans been successful in Santo Domingo, France probably would have been able to take, occupy and hold the Spanish owned Floridas and continue to possess the Louisiana territory with adequate forces.—Patterson, R. U.: Some Important Contributions to Medical Science by Military Surgeons, *J. Oklahoma M. A.* **29**:157 (May) 1936.

THE CHOICE OF BISMUTH OR MERCURY WITH ARSPHENAMINE

IN THE TREATMENT OF EARLY SYPHILIS

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After a quarter century of experience with the arsphenamines, there are still schisms in the ranks of experts over many vital phases of their use in the treatment of syphilis. It is not surprising, then, that the status of bismuth—in use as an antisyphilitic only a little over a decade—should not have achieved the fixity of the Decalogue. The physician who declines to depend on the drug salesman for his choice, and who attempts instead to sift the testimony of experienced users of bismuth, will find these divided, like Caesar's Gaul, in partes tres: one, led by the French, who see in bismuth a sort of miracle drug, destined to replace the arsphenamines because equally efficacious but less toxic; a second, who believe that bismuth cannot replace the arsphenamines but that as an adjuvant it has certain advantages over mercury, for which it may be substituted either entirely or in part, and a third who evidently feel about bismuth much as a famous Viennese doctor did about mercury when he pronounced it "a crime against the human race."

The stand of the "Bismuth über alles" exponents is already weakened by the generally admitted increase in the incidence of syphilis in France, where bismuth was almost universally substituted for the arsphenamines during the decade following its introduction in 1921. It was noticeable at the Réunion dermatologique in Strasbourg in June 1930 that even the French speakers differed among themselves in regard to the actual accomplishments of bismuth, several eminent syphilologists challenging the optimistic reports from the Fournier clinic and advocating that an arsphenamine be alternated with bismuth, at least in early syphilis. Those of the opposite extreme, who would ban bismuth at any price, seem to consist mostly of those who, like the French, embraced the new drug with initial enthusiasm as better than arsphenamine and, having found its action considerably short of miraculous, will henceforth have none of it.

Together with the majority of American syphilologists, we take the middle ground: we would by all means make arsphenamine bear the brunt of the attack in early syphilis and use mercury or bismuth as an adjunct. On the question of bismuth versus mercury, however, we have found the literature largely a literature of impressions, with surprisingly few systematic comparisons of the two. It was in an effort to determine at first hand the relative efficacy of the two drugs in the treatment of early syphilis that we decided to study the results achieved with various preparations of each, on groups of hitherto untreated syphilitic patients at the Vanderbilt Clinic. A few patients attending City Hospital also were included in the study.

PROCEDURE

A certain number of patients admitted with primary or early secondary syphilis were placed immediately on bismuth or mercury preparations for a limited trial period, so that we might observe their response to these drugs, uncomplicated by the arsphenamine factor. During this time the patient's general improvement, the healing of surface lesions and the disappearance of Spirochaeta pallida from the lesions were recorded. All these patients were placed on the standard arsphenamine-bismuth or arsphenamine-mercury treatment as soon as their surface lesions had healed. We also followed the results obtained with patients treated on the standard arsphenamine-bismuth or arsphenamine-mercury plan from the beginning. This combined treatment in both groups of patients was then further evaluated on the basis of (1) the reversal of the Wassermann reaction, (2) the number and type of relapses, (3) the patient's tolerance of the drug, and (4) his clinical and serologic behavior after completing the prescribed treatment.

The standard treatment plan to which we attempt to hold every clinic patient admitted with early syphilis calls for a total of three courses, of ten injections each, of an arsphenamine and three courses of fifteen injections each of a mercury or bismuth preparation throughout the first year. During the first month the arsphenamine and mercury or bismuth courses run concurrently; thereafter they alternate or overlap, so that the patient is continuously under treatment with one or the other, or both. The first six injections of arsphenamine may be given twice weekly and the following four at weekly intervals, or they may be given as often as every other day for six injections and the following four at three, four, five and six day intervals to complete the first course. The second and subsequent courses of arsphenamine are given twice weekly for the first six injections and weekly for the following four. The interval between the first and second courses of arsphenamine should be four weeks, between subsequent courses six weeks.

The first course of fifteen injections of mercury or bismuth is given at four or five day intervals for the first six injections and weekly for the following injections of the course. Both intravenous and intramuscular injections may be given at the same visit, for the convenience of the patient, except that during the first two weeks the patient receives from four to six injections of arsphenamine and only three of mercury or bismuth. Between arsphenamine courses, and while the patient is receiving only mercury or bismuth, he is also given potassium iodide by mouth.

If at the end of the first year the blood Wassermann and spinal fluid reactions are negative and there has been neither serologic nor clinical relapse, the patient is permitted to stop treatment and remain under observation, returning at intervals of three months for blood tests during the second year, and at longer intervals thereafter.

This regimen could not always be followed. The Vanderbilt Clinic is not a free clinic and this department has no Saturday or evening hours, so that many employed patients in the lower income brackets find it difficult or impossible to attend more than once a week over any considerable length of time. A number of cases included in the original investigation were excluded from the final analysis because of irregular attendance or other accidental factors which might have interfered with a fair appraisal of the drugs used. Those included may be understood to be patients with syphilis whose infection was of not more than six months' duration at the time they began treatment and who attended with fair regularity. The study comprises 379 cases in all.

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CHOICE OF BISMUTH PREPARATIONS

The mechanism of action of bismuth compounds in the organism is not yet understood, but it seems to depend chiefly on the amount of bismuth metal that can be introduced without toxic effects. At least no differences in the therapeutic efficacy of bismuth compounds have been noted that cannot be accounted for by the ease with which the bismuth metal is split off and taken up by the organism. Of salts in aqueous solution, only one-fourth or one-fifth as much can be injected at a time, as of compounds suspended in oil. And of the amount injected, it appears to be that fraction in active circulation which is therapeutically effective. But this circulating bismuth is for the most part on its way out of the system by way of urine and feces, a small part probably being held back in various organs and released later. Since the compounds in aqueous solution—because of both the smaller individual dose and the aqueous medium—are absorbed and eliminated very rapidly, injections must be given at intervals of one or two days in order to maintain an adequate concentration of the metal in the blood stream. This drawback is increased by the fact that injections of the salts in aqueous solution are usually painful. On the other hand, bismuth compounds suspended in oil, besides being well tolerated in larger amounts, are absorbed much more slowly and eliminated only gradually, so that even with one injection weekly a fair amount of the bismuth metal remains in circulation. Bismuth in oily solution, introduced more recently, is considered to combine many of the advantages of both the foregoing groups with a minimum of their disadvantages. Its action begins more promptly than that of the oily suspensions. It is absorbed more slowly than the soluble salts and therefore remains in circulation longer than these, but its release is not so slow as to risk accumulating toxic residues at the site of injection. Like the oily suspensions, bismuth in oily solution is relatively painless on injection and is even less apt to form sterile abscesses later on. It was with these considerations in mind that the following preparations of bismuth were selected for use in the overwhelming majority of cases in the Vanderbilt Clinic:

Sodium Potassium Bismuth Tartrate.—This is the suspension in olive and almond oils, with butyn, each cubic centimeter containing 50 mg. of metallic bismuth. Of the various bismuth preparations investigated by Cole and his co-workers,[1] the oily suspension of the water-soluble tartrate gave evidence of being absorbed more rapidly than the oily suspension of the insoluble bismuth salicylate but more slowly than the various watery or oily solutions tested, so that one injection a week is sufficient to maintain an active fraction in circulation. The injections are relatively painless, and Raiziss[2] found this to be one of the least toxic of various bismuth preparations tested. The individual dose is usually 1 cc. (50 mg. of metallic bismuth) at the beginning and is increased to 2 cc. after the first few injections, making a total of about 1,350 mg. of bismuth metal in a course of fifteen injections.[3]

Bismo-Cymol (N. N. R.).—This is the basic bismuth camphocarboxylate in solution in olive oil, each cubic centimeter containing 50 mg. of metallic bismuth. Its toxicity, investigated by Kolmer,[4] both in animal experiments and in clinical trials, was found to be very low, the maximum tolerated dose being fifteen times the amount of the therapeutically active dose. Raiziss[2] also found this preparation to be less toxic than other oil-soluble preparations of bismuth. The initial dose of 1 cc., representing 50 mg. of metallic bismuth, is increased after a few injections to 2 cc., giving the patient a total of about 1,350 mg. of bismuth metal per course, as in the case of the tartrate.

A few patients in City Hospital who were treated with biliposol (N. N. R.) and a few Vanderbilt Clinic patients who received potassium bismuth tartrate (N. N. R.) were also considered eligible for inclusion in the present study. The same dosage scheme was followed for these preparations as for those already discussed (from 1 to 2 cc. weekly). Biliposol, an oil-soluble preparation containing 40 mg. of elemental bismuth in 1 cc., would provide about 1,080 mg. of bismuth per course of fifteen injections. The excessive cost of this otherwise satisfactory preparation has interfered with its wider trial in the two clinics. The potassium bismuth tartrate in suspension in almond oil contains 33.5 mg. of elemental bismuth in 1 cc. and would supply a total of from 900 to 1,000 mg. of bismuth per course. This preparation was replaced by the sodium potassium bismuth tartrate largely on account of the higher bismuth content of the latter product. Any patients who had difficulty in tolerating injections of the oil-suspended salts could usually tolerate the oil-soluble bismo-cymol.

CHOICE OF MERCURY PREPARATIONS

The same general considerations that have been set forth briefly with regard to bismuth apply also to the choice of mercury preparations, except that the metal content of the various mercurials is subordinate to factors making for tolerance, because of the narrower margin of safety between the therapeutic and toxic doses.

Mercuric salicylate, given in the great majority of cases in the present study, has been used so widely and over so long a period that it would be superfluous to review its claims here were it not for the recent tendency of some syphilologists to demote it in favor of the water-soluble succinimide. Mercuric salicylate, or, more accurately, the basic mercuric anhydride of salicylic acid, contains about 55 per cent of metallic mercury and is relatively painless when injected intramuscularly in a suspension of a vegetable oil. Absorption begins promptly, as shown by comparatively high excretion curves within twenty-four hours after injection,[5] but excretion continues more slowly for a considerable period after the end of a course, thus providing an advantage over the soluble mercurials similar to that of the insoluble salts of bismuth. Weekly injections, beginning with one-half grain (0.03 Gm.) and increasing to 1 grain (0.065 Gm.), keeps a fair amount of the metal in circulation, as evidenced by excretion, and if courses are alternated either with an arsphenamine or a bismuth preparation, toxic symptoms are relatively infrequent.

1. Sollmann, Torald; Cole, H. N., and Henderson, Katharine I.: Excretion of Bismuth in a Series of Clinical Bismuth Treatments, Arch. Dermat. & Syph. **28**: 615 (Nov.) 1933.

2. Raiziss, G. W.; Severac, Marie, and Moetsch, J. C.: Toxicity of Various Compounds of Bismuth Used in the Therapy of Syphilis, J. Chemotherapy **10**: 77 (Jan.) 1934.

3. This preparation is manufactured by the Dermatological Research Laboratories of Philadelphia and is not to be confused with the so-called sodium potassium bismuth tartrate known as "Trepol," used so extensively in France and found by the Council on Pharmacy and Chemistry of the American Medical Association to be virtually a basic bismuth tartrate containing small amounts of potassium, sodium and calcium salts as impurities, and some uncombined potassium sodium tartrate. See Warren, L. E.: What is the Composition of Bismuth Tartrates Used in the Treatment of Syphilis? J. A. M. A. **84**: 1067 (April 4) 1925.

4. Kolmer, J. A.: Basic Bismuth Campho-Carboxylate (Bismo-Cymol) in the Treatment of Syphilis, Am. J. Syph. **15**: 190 (April) 1931.

5. Lomholt, S., also Bürgi, E.: Handb. d. Haut- u. Geschlechtskr. **18**: 1, 1928.

Mercuric succinimide (N. N. R.), the mercuric salt of succinic acidimide, containing approximately 50 per cent of mercury, has proved a worthy addition to the list of soluble mercurials. Like other soluble preparations, it is painful on injection and is absorbed so rapidly that daily injections are needed in order to maintain an adequate concentration in the blood stream. These drawbacks render it impracticable for routine clinic use, but it is valuable in cases in which prompt action is important and the arsphenamines are contraindicated. For patients included in this study, the standard dose was one-fourth grain (0.016 Gm.) given daily or on alternate days.

BISMUTH AND MERCURY AS SPIROCHETICIDES

It is doubtful whether either mercury or bismuth exerts direct spirocheticidal action in the system. In vitro, bismuth does not kill Spirochaeta pallida even when mixed with serum, but with extracts of certain organs, especially liver, it forms a compound known theoretically as "bismoxyl," which is spirocheticidal. Kolle's experiments indicate that bismuth inhibits the growth of the parasite without destroying it. As for mercury, Lomholt has shown that Spirochaeta pallida could grow in a concentration of mercury in the blood serum more than twice as great as that prevailing in the blood of a patient at the saturation point, or limit of tolerance at which toxic symptoms appear. These and other facts suggest that whatever spirocheticidal action is exerted by mercury, and to a certain extent that exerted by bismuth, is indirect, by stimulating the tissues to a stronger defense reaction. Since for a direct attack on Spirochaeta pallida we depend primarily on the arsphenamines, the performance of the heavy metals in this respect is of secondary importance. Nevertheless, because the disappearance of spirochetes from open lesions furnishes one of the few visible criteria of a drug's action, we made systematic darkfield examinations from fifty-two cases of primary syphilis. Half the patients in this group received mercury and the other half bismuth preparations. None received any arsphenamine during this test period.

In eleven of the fifty-two cases, Spirochaeta pallida could not be found in the chancre fluid, usually because the patient had already used a local disinfectant. In two instances positive gland punctures were obtained where the chancre fluid had been negative. The procedure regularly followed was to make three preparations at each visit, and a "negative" was reported only after all three preparations had proved negative on at least two successive visits. Up to fifty fields were examined on each preparation, depending on the scarcity of organisms.

Among the bismuth-treated cases with positive darkfield before beginning treatment, Spirochaeta pallida disappeared

After 1 injection in 1 to 7 days in 12 cases.
After 2 injections in 3 to 13 days in 7 cases.
After 3 injections in 11 to 18 days in 2 cases.

In one additional case treated with bismo-cymol, spirochetes were still present after three injections, thirteen days after treatment was begun.

Among the mercury-treated cases, Spirochaeta pallida disappeared

After 1 injection in 2 to 5 days in 4 cases.
After 2 injections in 4 to 11 days in 12 cases.
After 3 injections in 9 days in 1 case.
After 4 injections in 8 days in 1 case.
After 5 injections in 6 days in 1 case.
After 7 injections in 31 days in 1 case.

Superficially, the results indicate a superiority of bismuth over mercury as a spirocheticide, since 86 per cent of the bismuth-treated patients as against 80 per cent of the mercury-treated patients had negative darkfields after one or two injections of the drug; or, stated in terms of days, one might expect to find a negative darkfield by the fifth day from the average bismuth-treated patient, but not until the eighth day from the average patient under mercury. Allowance should be made, however, for the fact that the four patients who received the succinimide would perforce show a larger number of injections, as this drug was given at shorter intervals than the salicylate. Spirochetes were found in the chancres of some patients from both the bismuth and mercury groups up to the healing of the lesions, and in both groups there were instances in which spirochetes were found in abundance after the lesion had completely epithelized, when the surface was scraped and fresh serum obtained from beneath.

In the preparations from treated patients were observed many atypical forms of Spirochaeta pallida—branched, budding and fissured forms interpreted by some investigators, notably Noguchi, as regression forms, by others as organisms in process of active multiplication. In every such case the original preparations made before the patient had received any treatment had shown typical Spirochaeta pallida from the same lesion. One case presented two penile chancres, one with a moist necrotic surface abounding in typical Spirochaeta pallida, the second with a healed surface and button-like induration showing the atypical forms after the lesion had been scraped and fluid collected on the slide.

THE COMPARATIVE VALUE OF BISMUTH AND MERCURY AS JUDGED BY THE HEALING OF PRIMARY LESIONS

Of patients admitted with primary syphilis, sixty-eight were found whose records showed regular treatment (not less than once a week) either with bismuth or mercury preparations alone or with the combined bismuth-arsphenamine or mercury-arsphenamine treatment. The effect of this treatment on the healing of primary lesions has been summarized in table 1. From this it will be seen that among the patients who received only mercury or bismuth preparations from the beginning there was less than a day's difference in the average time required for the primary lesion to heal: 15.8 days for the eighteen patients treated with bismuth preparations alone, and 16.6 days for the twenty who received only mercurials. Thirty-one days was the longest time required for either group. There was no appreciable difference in the time of healing for patients who received the sodium potassium bismuth tartrate and those who received biliposol. Bismo-cymol was not represented in this group. In the majority of cases the chancre healed after the third injection, the average for the bismuth group being 3.5 injections, representing an average of 0.234 Gm. of bismuth metal. In the mercury group the average time of healing was exactly the same for patients who received the insoluble mercuric salicylate and those who were given the soluble succinimide, but the latter were obliged to have nearly three times as many injections as the former to secure similar results—an average of nine injections of the succinimide as against 3.6 injections of the salicylate.

Among the patients who received bismuth-arsphenamine treatment from the beginning, the chancres

healed in an average of eighteen days, while the average for the corresponding mercury-arsphenamine group was 20.8 days. Or, to judge from the time average of 16.9 days for all thirty-six bismuth-treated primaries, as compared with 18.2 days for the thirty-two mercury-treated ones, a primary lesion might be expected to heal from one to three days sooner under bismuth than under mercury, whether or not the patient received any arsphenamine in the meantime. Curiously enough, the time of healing averages several days less for patients treated with mercury or bismuth alone than for those who received some concomitant arsphenamine treatment. This advantage however is more apparent than itself. It should be understood, of course, that with clinic patients the time recorded for the healing of lesions is often several days longer than the actual time, since the patient as a rule would not be seen by his physician after the "healing" injection until he returned for the next injection scheduled.

TABLE 1.—*The Comparative Value of Bismuth and Mercury in the Healing of Primary Lesions*

	Bismuth Alone 18 Cases	Mercury Alone 20 Cases	Bismuth-Arsphenamine* 18 Cases	Mercury-Arsphenamine* 12 Cases	All Bismuth 36 Cases	All Mercury 32 Cases
Average time and injections required	15.8 days 3.5 injections	16.6 days 3.6 injs. Hg Sal. or 9 injs. Hg Sue.	18 days 3.4 injs. Bi 4.9 injs. Arsph.	20.8 days 3.3 injs. Hg Sal. 6.3 injs. Arsph.	16.9 days	18.2 days

* The majority of the bismuth-arsphenamine patients and all the mercury-arsphenamine patients received silver arsphenamine for their arsphenamine.

THE HEALING OF SECONDARY LESIONS

The healing of secondary lesions was studied from the records of 180 patients admitted with florid secondary manifestations and treated regularly either with mercury or bismuth preparations alone or with an arsphenamine in addition to mercury or bismuth.

real, because it happens that the overwhelming majority of patients in this particular primary group who were placed on the standard arsphenamine-bismuth or arsphenamine-mercury plan from the beginning were given silver arsphenamine, and some of them had received as many as five or six injections of this preparation before the intramuscular injections were begun. Since this time, silver arsphenamine has demonstrated itself to be much slower in action than arsphenamine. One of our previous studies[6] showed that ordinary primary lesions of patients treated with arsphenamine and either bismuth or mercury as an adjunct will heal in an average of nine or ten days; more recent cases, in which slightly smaller doses were given, averaged 12.5 days (table 2). Either of these represents a much

TABLE 2.—*The Comparative Value of the Arsphenamines* in the Healing of Primary Lesions*

	Arsphenamine 20 Cases	Silver Arsphenamine 25 Cases	Neoarsphenamine 13 Cases
Average time and injections required	12.5 days 3.1 Arsph. injections	18.4 days 5.4 Arsph. injections	21.3 days 4.8 Arsph. injections

* Practically all patients received some bismuth or mercury besides the arsphenamine.

shorter time than that required for bismuth or mercury alone or for a combination of either with silver arsphenamine.

Although the "bismuth alone" group received preponderantly sodium potassium bismuth tartrate, and the "bismuth-arsphenamine" group preponderantly bismocymol, both bismuth groups received almost identical average amounts of bismuth metal (0.234 and 0.25 Gm. respectively), the slight advantage being with the bismuth-arsphenamine group. The "mercury alone" and "mercury-arsphenamine" groups, both of whom received a majority of their intramuscular injections in the form of mercuric salicylate, show a greater difference in the time of healing (16.6 days vs. 20.8 days) than do the two bismuth groups (15.8 days vs. 18 days), so that the apparent disadvantage of using an arsphenamine seems to lie in the choice of the arsphenamine

6. Cannon, A. B., and Karelitz, M. B.: The Comparative Value of the Arsphenamines in the Treatment of Early Syphilis, J. A. M. A. **97**: 1523 (Nov. 21) 1931.

If the relative efficacy of bismuth and mercury alone on all types of secondary lesions (table 3) is considered first, results indicate a slight advantage for mercury, since the average time of healing for the forty-five patients treated with mercury preparations was 20.8 days, as compared with 22.2 days for the fifty patients treated with bismuth preparations. The time average was identical for the patients who received mercuric salicylate and those who received the succinimide, but the latter were obliged to have between two and three times as many injections in order to achieve the same results. The majority of the patients in the bismuth group received sodium, potassium bismuth tartrate and the group averaged 0.292 Gm. of bismuth metal before secondary lesions were entirely healed.

With regard to the number of injections, mercury shows itself prompter but more uneven in its action than bismuth. Considering only the cases treated with the salicylate, and remembering that two or three times as many injections of the succinimide would be required, one finds that very nearly half the thirty-seven mercury-treated patients had their lesions healed by the time they had received three injections, whereas less than one third of the fifty bismuth-treated patients were free from manifestations after three injections. After five injections, 81 per cent of the mercury-treated patients were lesion free, as compared with only 66 per cent of the bismuth-treated ones. However, after a sixth injection all but four of the bismuth group had cleared, the slowest requiring eight injections, while seven of the mercury group still remained, the slowest of these requiring eleven injections to clear entirely. In addition, there were two cases which responded so poorly to mercury that the patients were placed on arsphenamine treatment before the lesions had healed.

When an arsphenamine was given along with a mercury preparation from the beginning (thirty-four cases), the time for the healing of secondary manifestations averaged slightly less than it did under the bismuth-arsphenamine plan (fifty-one cases) but the difference was negligible: twenty days for the mercury-arsphenamine group and 20.7 days for the bismuth-arsphenamine group. Mercuric salicylate and bismo-cymol were the only preparations given intramuscularly in these groups, while arsphenamine, silver

arsphenamine and neoarsphenamine were all represented, silver arsphenamine preponderating in both groups.

If all the bismuth-treated secondaries are combined in one group and all the mercury-treated secondaries in another, both those patients who received some arsphenamine and those who did not, there remains an advantage of one day, on the average, in favor of mercury (20.4 days as against 21.4 days for bismuth). A glance at the figures comparing the different arsphenamine preparations among themselves will show that either arsphenamine or silver arsphenamine, in combination with intramuscular injections, acts more promptly than mercury or bismuth alone, but that even mercury or bismuth alone is more effective than a combination with neoarsphenamine, which gives the slowest response of all (an average of 23.7 days for forty-eight cases).

Looking back over the aggregate results obtained with preparations of bismuth and mercury, either alone or in combination with an arsphenamine, in the healing of primary and secondary lesions, it might be inferred that in the primary stage, before the body has developed its own defense mechanism, bismuth is more effective than mercury—possibly by virtue of its spirocheticidal properties; whereas by the time the body has elaborated its own defenses, as evidenced by the appearance of secondary manifestations, the stimulating action of mercury is more potent, though less uniform, than bismuth. When an arsphenamine is used in conjunction with a heavy metal, as would usually be done in practice, arsphenamine will give the best results, and the advantage of either heavy metal over the other shrinks to minor proportions.

TABLE 4.—*The Comparative Value of the Arsphenamines in the Healing of Secondary Lesions*

	Arsphenamine 35 Cases	Silver Arsphenamine 71 Cases	Neoarsphenamine 48 Cases
Average time and injections required	19.5 days 4 Arsph. injections	19.2 days 4.4 Arsph. injections	23.7 days 6.2 Arsph. injections

TABLE 3.—*The Comparative Value of Bismuth and Mercury in the Healing of Secondary Lesions*

	Bismuth Alone 50 Cases	Mercury Alone 45 Cases	Bismuth-Arsphenamine 51 Cases	Mercury-Arsphenamine 34 Cases	All Bismuth 101 Cases	All Mercury 79 Cases
Average time and injections required	22.2 days 4.5 injections	20.8 days 4.2 injs. Hg Sal. or 9.3 injs. Hg Suc.	20.7 days 3.7 injs. Bi 4.5 injs. Arsph.	20 days 3.2 injs. Hg Sal. 4.7 injs. Arsph.	21.4 days	20.4 days

THE COMPARATIVE VALUE OF BISMUTH AND MERCURY IN REDUCING A POSITIVE WASSERMANN REACTION

The comparative value of bismuth and mercury in reducing a positive Wassermann reaction was perforce evaluated on the basis of the combined bismuth-arsphenamine and mercury-arsphenamine treatment, except that the limited number of patients aforementioned received a partial course of the intramuscular injections before beginning their first arsphenamine course, whereas the majority were started at once on the combined treatment. Since only one seropositive primary patient had a reversal of the Wassermann reaction under the intramuscular treatment alone (after five injections of mercuric salicylate, twenty-three days after beginning treatment) and no essential difference was noted in the serologic behavior of the two groups thereafter, this factor will be ignored in presenting the results in the primary cases.

TABLE 5.—*The Comparative Value of Bismuth, Mercury and the Arsphenamines in Reducing a Positive Wassermann Reaction in Primary Syphilis*

	Bismuth* 15 Cases	Mercury† 21 Cases	Arsphenamine‡ 19 Cases	Silver Arsphenamine‡ 20 Cases	Neoarsphenamine‡ 19 Cases
Average time and injections to 1st negative Wassermann reaction	65.4 days 10.4 Bi injs. 8.7 Arsph. injs.	61.8 days 8.9 Hg injs. 8.6 Arsph. injs.	38.2 days 7 Arsph. injs.	66.1 days 9 Arsph. injs.	71 days 10 Arsph. injs.
Remained positive 6 mos. or over	None	1 case	1 case	2 cases	5 cases

* All received some arsphenamine in addition.
† All but one received some arsphenamine in addition.
‡ All received bismuth and/or mercury in addition.

In Primary Syphilis.—Of patients admitted in the seropositive primary stage, thirty-six were found who had attended regularly at least until the Wassermann reaction became negative, receiving an arsphenamine and various amounts of mercury or bismuth. The fifteen who received bismuth preparations (sodium potassium bismuth tartrate and bismo-cymol) required an average of 65.4 days to become Wassermann negative, while twenty mercury-treated patients (all of whom received mercuric salicylate) became Wassermann negative in an average of 61.8 days, one patient treated with mercuric salicylate and silver arsphenamine remaining positive throughout nine months of fairly regular treatment and then showing fluctuating serologic reactions for an additional two years. Of twenty-six patients admitted in the seronegative primary stage, eleven, or about 40 per cent, became seropositive within a few weeks after beginning treatment and then reverted to negative as treatment was continued. This occurred in about equal proportions in both mercury and bismuth groups, and among those who received an arsphenamine from the beginning as well as those who were started on bismuth or mercury alone.

Besides these transitory positives occurring in patients who began their treatment in the seronegative stage, there were two early serologic relapses among regularly treated primaries in the mercury group and one in the bismuth group. Not one of the three was strongly positive, and all later reverted to negative. A number of patients showed a positive Wassermann reaction after absenting themselves from the clinic for various lengths of time, but it would be obviously unfair to consider these cases as indicative of the efficacy or inefficacy of the drugs used.

If the serologic response of the patients who began their treatment before secondary manifestations had

appeared are balanced, it might be concluded that those who receive mercury in addition to an arsphenamine have a slight advantage over those who receive bismuth, in that a positive Wassermann reaction became negative in the mercury group about four days earlier, on the average, than in the bismuth group. But one patient treated with mercury would probably be classed as Wassermann fast, and the proportion of serologic relapses was slightly higher in the mercury group, although the number of cases is too small for this to be of much significance.

In Secondary Syphilis.—All patients discussed here were admitted with florid secondary manifestations and a strongly positive Wassermann reaction. Altogether 158 were considered eligible for comparative study, having been treated regularly at least until their Wassermann reaction became negative, or, in the Wassermann-resistant cases, for not less than six months. The majority were under treatment and observation for one year or longer. The serologic results were evaluated on the basis of the combined bismuth-arsphenamine and mercury-arsphenamine treatment, except that slightly less than one third of the patients received a partial course of bismuth or mercury before beginning their first arsphenamine course, while the majority received the combined treatment from the beginning. In the belief that it might be of interest to see whether this difference affected the outcome, we recorded the results separately for the different groups.

If first the patients who began their treatment on the heavy metals alone are examined, twenty-six receiving bismuth preparations and twenty-three mercurials, the results as summarized in table 6 disclose a decided advantage for bismuth over mercury, in that the time necessary to secure a negative Wassermann reaction averaged 83.4 days for the bismuth group, as against 92.3 days for the mercury group. Moreover, three of the mercury-treated cases and only one of the bismuth-treated cases remained positive for over six months. These persistent positives were not included in computing the averages.

Considering next the 108 patients who had the typical combined treatment from the beginning, one half receiving bismuth and arsphenamine, the other half mercury and arsphenamine, we find that all but two in the bismuth-arsphenamine group became Wassermann negative in an average of 79.9 days from the time of beginning treatment, while the patients in the corresponding mercury-arsphenamine group required 82.6 days. The two remaining bismuth-arsphenamine cases and five mercury-arsphenamine cases remained positive for over six months of regular treatment.

TABLE 6.—*Serologic Response to Mercury and Bismuth Compared, in Secondary Cases Under Regular Treatment*

	Bismuth Alone* 26 Cases	Mercury Alone* 23 Cases	Bismuth-Arsphenamine 54 Cases	Mercury-Arsphenamine 54 Cases	All Bismuth 80 Cases	All Mercury 77 Cases
Average time and injections to 1st negative Wassermann reaction	83.4 days 11.7 injs. Bi 8 injs. Arsph.	92.3 days 12.9 injs. Hg 8.9 injs. Arsph.	79.9 days 10.2 injs. Bi 9.4 injs. Arsph.	82.6 days 10.3 injs. Hg 10.5 injs. Arsph.	81.1 days	85.4 days
Still positive after 6 months or more of regular treatment	1 case	3 cases	2 cases	5 cases	3 cases	8 cases
Serologic relapse in 1st year, during regular treatment	3 cases†	1 case†	6 cases†	5 cases‡	9 cases	6 cases
All cases with unsatisfactory serologic response to early regular treatment	4 cases	4 cases	8 cases	10 cases	12 cases	14 cases

* Intramuscular injections alone until surface lesions healed, then arsphenamine in addition.
† all were ± and reverted to negative under continued treatment.
‡ Four were ± and reverted to negative under continued treatment.

Taking all bismuth-treated secondaries under consideration here (eighty cases) and all mercury-treated secondaries (seventy-seven cases), the mercury group still requires an average of 85.4 days to achieve a negative Wassermann reaction, while the bismuth group requires only 81.1 days. In addition, there are more than twice as many persistently positive Wassermann reactions among the mercury-treated cases as among the bismuth-treated ones. As might be expected, those patients who received an arsphenamine from the start, in addition to a heavy metal, fared better than did the ones who received only bismuth or mercury until their surface lesions had healed. Arsphenamine, silver arsphenamine and neoarsphenamine are represented in both groups, but it so happens that the mercury-arsphenamine group contained a larger proportion of patients treated with neoarsphenamine than did the bismuth-arsphenamine group. As may be seen from table 7, neoarsphenamine makes the poorest showing of all the arsphenamines in reducing a positive Wassermann reaction in secondary syphilis, so that one may reasonably surmise that mercury if given in conjunction with a more active arsphenamine—preferably arsphenamine—would show itself to be more nearly equal in potency to bismuth.

TABLE 7.—*The Comparative Value of the Arsphenamines in Reducing a Positive Wassermann Reaction in Secondary Syphilis*

	Arsphenamine 101 Cases	Silver Arsphenamine 64 Cases	Neo-arsphenamine 122 Cases
Average time and injections to 1st negative Wassermann reaction	82.5 days 10 Arsph. injections	87.6 days 10 Arsph. injections	103.5 days 14 Arsph. injections
Remained positive 6 mos. or over	7 cases (6.9%)	10 cases (15.6%)	17 cases (14%)

All received bismuth and/or mercury in addition to the arsphenamine.

SEROLOGICALLY RESISTANT AND RELAPSING CASES, BOTH PRIMARY AND SECONDARY, UNDER REGULAR TREATMENT

Besides those secondary cases in which the Wassermann reaction remained persistently positive throughout six months or more of regular treatment (eight cases under mercury and three under bismuth), there were some which reverted to a weak positive after having become negative and while the patients were still under regular treatment. The distribution of these cases may

be seen in table 6. Of the secondary patients who began their treatment on mercury or bismuth alone, three reverted temporarily to a positive serologic reaction while under active treatment with bismuth preparations, but only one relapsed while under active treatment with mercury. Among the much larger number of patients who were given the combined treatment from the beginning, the groups being evenly divided between bismuth and mercury, there were six relapsing Wassermann reactions among the bismuth-arsphenamine cases and five among the mercury-arsphenamine ones. For the sake of completeness it will be well to add to the picture those patients who failed to respond adequately to treatment begun in the seropositive primary stage: one Wassermann-resistant case and two serologic relapses under regular treatment with mercuric salicylate and silver arsphenamine, and one serologic relapse under bismo-cymol and silver arsphenamine. This makes a total of thirteen bismuth-treated patients, or 13.7 per cent, and seventeen mercury-treated patients, or 17.2 per cent, who failed to show an entirely satisfactory serologic response to early regular treatment. This disregards patients admitted in the seronegative primary stage, among whom occurred a number of transitory positives within a few days or a few weeks after treatment was begun; these are always open to suspicion as having been on the verge of becoming seropositive when treatment was initiated, in which case the first injection or injections evidently act as a provocative. Late recurrences, appearing after the completion of a year or more of treatment, will be considered under "End Results."

The early relapsing Wassermann reactions enumerated here in all but a single instance were of the ± grade (cholesterinized antigen 2 +, alcoholic antigen negative, Kahn negative), and reverted to negative as the treatment was continued. How much significance attaches to these temporarily recurrent positives, it is difficult to say: they may represent only the vagaries of a highly sensitive cholesterinized antigen, but until more is known regarding this factor, it was deemed best to report the reactions as they were. For some, at least, of the persistently positive Wassermann reactions it is probable that insufficient dosage is responsible. At any rate these patients were found to have averaged about 20 mg. less of bismuth metal per week and from 15 to 20 mg. less of mercury salts per week than did those patients whose Wassermann reaction became negative within the usual time.

END RESULTS

So far we have considered chiefly the response of the various treatment groups to early treatment. It is now necessary to see what proportion of these patients remained symptom free after having completed the minimum amount of treatment considered adequate to prevent a relapse; namely, one year of regular treatment with an arsphenamine and a heavy metal in alternating and/or overlapping courses. One should remember that in separating out the eligibles from the ineligibles it was necessary to eliminate not only patients who had attended irregularly or for an inadequate length of time but also those who had been adequately treated for the required year or more, if for any reason more than one heavy metal had been administered during this time. Thus, in a considerable number of cases, mercury and bismuth courses were alternated, either because a patient manifested some symptoms of intolerance to one drug or because the attending physician wished to avoid such a contingency. There is also the theoretical possibility of the parasite becoming mercury fast or bismuth fast, when one or the other drug is continued over long periods.

Among the sixty-seven cases finally included as eligible for comparing end results, the distribution of favorable and unfavorable outcomes may be seen in table 8. The only patient of this number who manifested a clinical relapse returned to the clinic with generalized serpiginous lesions and a strongly positive Wassermann reaction ten months after having completed a first year of regular treatment, during which time he had received twenty-six intravenous injections of silver arsphenamine and thirty intramuscular injections of bismo-cymol, a total considerably below the optimum recommended.

A study of serologic relapse occurring after one year of regular treatment reveals five recurrences in the bismuth group and four in the mercury group, three of each reverting later to negative, with or without further treatment. As was pointed out in connection with serologic relapses occurring during early treatment, the significance of this phenomenon is the more difficult to evaluate, in view of the fact that more than half these recurrent positives were of the doubtful variety and reverted to negative without further treatment. Two additional cases, however, both treated with mercuric salicylate and silver arsphenamine, remained Wassermann fast, one of them fluctuating between ± and negative for nearly three years.

TABLE 8.—*Results of Bismuth and Mercury Compared, in Patients Treated Regularly for One Year or More*

	Total Number of Patients Treated Regularly for 1 Year or Longer*	Unsatisfactory Behavior After One Year or More of Regular Treatment			Summary	
		Clinical Relapse	Serologic Relapse	Wassermann Fast	Satisfactory	Unsatisfactory
Bismuth	26	1	5†	0	20 77%	6 23%
Mercury	41	0	4†	2	35 85.4%	6 14.6%

* Includes only patients treated with a single heavy metal throughout.
† Three later reverted to negative.

Tests of the spinal fluid revealed a number of positives among patients with early syphilis as yet untreated or only partially treated, all becoming negative under further treatment; but only one patient showed a positive spinal fluid after completing one year of regular treatment. This patient, a woman of 58 admitted with florid secondaries, through an excess of caution was given only one-half the regulation dosage of silver arsphenamine and mercuric salicylate. Her blood Wassermann reaction also reverted to positive and the case is among those already recorded under serologic relapse. At the time of writing, eleven months later, the patient is under treatment and still free from any clinical symptoms of neurosyphilis.

If all these recurrent manifestations are counted at their face value in order to balance the respective achievements of the mercury-arsphenamine and bismuth-arsphenamine treatment, we are left with six cases in each group which showed unsatisfactory behavior after one year of regular treatment. Since the mercury-arsphenamine group is the larger, the

proportion of unsatisfactory outcomes is smaller in this group, and its percentage of satisfactory outcomes is 85.4 as against 77 for the bismuth-arsphenamine group.

COMPLICATIONS DUE TO MERCURY OR BISMUTH

A bird's-eye view of the complications due to bismuth or mercury alone and those in which the heavy metals may have been a contributory factor is represented in table 9. The records of all patients in the present study were taken into account for this purpose. Immediate reactions traceable unequivocally to an arsphenamine were of course excluded. Complaints of "sore hip" without objective signs, while given due consideration, were not tabulated under local reactions.

There was no serious reaction attributed to bismuth alone in the entire series, and only one patient had a local reaction at the site of injection. This was a case of purpura which developed around the site of injection of bismo-cymol and attained a diameter of about 8 cm. It was in all probability due to the accidental rupture of a blood vessel, complicated by toxic properties of the drug. The most common by-effects attendant on the administration of bismuth preparations were stomatitis, gingivitis and the "bismuth line" along the gums. These occurred at different stages of treatment in different patients and irrespective of the preparation used. One patient also complained on three occasions of general lassitude and somnolence lasting for several days, with some elevation of temperature, after injections of bismo-cymol.

Three patients had fairly severe general reactions within a few hours after an injection of mercuric salicylate. One of these reported a temperature of 100.4 F., general malaise, chills, profuse sweating and diarrhea lasting two days, after a first injection of mercuric salicylate (three-fourths grain, or 0.05 Gm.). The next dose, cut to one-half grain (0.03 Gm.), was tolerated without mishap, as were subsequent doses of three-fourths and 1 grain (0.05 and 0.065 Gm.). A second patient, a strong healthy man, aged 38, reported a syncope followed by profuse perspiration a few hours after his third injection (one-half grain, or 0.03 Gm.) of mercuric salicylate. The third patient had chills, fever, congestion of the lungs, and a local swelling of the hip within a few hours after his twentieth injection (1 grain, or 0.065 Gm.) of mercuric salicylate. Not one of the three was receiving arsphenamine at the time. The symptoms in the third case suggest the entry of the needle into a vein, in which case the fault lies in the technic rather than in the drug. Two more patients reported fever and general malaise after several early injections of mercuric salicylate. Besides these general reactions there were more cases of stomatitis and also more local disturbances at the site of injection under mercury than under bismuth preparations, and they occurred as a rule much earlier in the course than did similar reactions to bismuth.

In fixing the blame for delayed reactions such as dermatitis, jaundice and neuritis, one can only infer from their relative frequency in the two treatment groups which of the heavy metals makes the less favorable combination with an arsphenamine, since all patients sooner or later had the combined treatment. There are almost twice as many cases of dermatitis and jaundice among patients treated with bismuth and an arsphenamine as among those who received mercury and an arsphenamine, although no dermatitis case in either group was of the severe exfoliative variety. In the literature, both dermatitis and jaundice have been reported in considerable numbers in patients treated with bismuth alone, whereas dermatitis following the internal use of mercury has been a rarity in modern times. Jaundice is not even mentioned in connection with mercury in the leading textbooks, and it is well known that the kidney, rather than the liver, is the organ most susceptible to mercury. The picture is often obscured by the physician's tendency to attribute to the arsphenamine all skin manifestations occurring under combined treatment. Thus in several such instances, when a dermatitis appeared, the physician discontinued the arsphenamine and gave the patient a series of sodium thiosulfate injections, while continuing the bismuth therapy. The rash persisted unchanged over uncommonly long periods, and one case of jaundice attributed to the arsphenamine persisted for four and one-half months while the patient continued his bismuth injections. The one case of neuritis in the entire series grew markedly worse when two injections of bismuth were given after the patient had complained of pains in the arms and legs and stiffness in the joints. Two cases of generalized pruritus without objective symptoms, one under mercury and one under bismuth medication, were the only other ill effects noted. No patient showed any evidence of nephritis or any significant changes in the blood counts, although a routine urinalysis was done at monthly intervals, and a blood count was made early and late in the courses of treatment. There were no hemorrhages of skin or mucous membranes other than the one case of traumatic purpura already mentioned.

TABLE 9.—*Complications*

	Attributed to Bismuth or Mercury Alone					Bismuth or Mercury Possibly Contributory				
	Stomatitis and/or Gingivitis	Bismuth Line	Local (Hip) Reactions	General Reactions	Total	Dermatitis	Pruritus	Jaundice	Neuritis	Total
Bismuth 180 cases	4 cases	3 cases	1 case	1 case	9 cases 5%	8 cases	1 case	14 cases	1 case	24 cases 13%
Mercury 199 cases	9 cases	.....	4 cases	5 cases	18 cases 9%	5 cases	1 case	9 cases	.....	15 cases 7.5%

SUMMARY AND CONCLUSIONS

On the basis of our observations as a whole, neither bismuth nor mercury appears to have such a decided advantage over the other as much strongly partisan testimony would lead one to believe. While in our comparative studies of the arsphenamines, arsphenamine proved to be almost uniformly superior to neoarsphenamine, and silver arsphenamine, by every criterion applied, no such clear-cut superiority could be discerned in the performance of either of the heavy metals. Spirochetes disappeared from primary lesions and the lesions themselves healed more promptly under bismuth than under mercury, but a positive Wasser-

mann reaction reversed earlier under mercury in the primary stage; in fact, one primary patient achieved a negative Wassermann reaction in twenty-three days under mercuric salicylate alone (five injections) while his chancre was still unhealed and spirochetes were still present in the chancre fluid. In secondary syphilis, however, the situation was reversed: mercury gave slightly better results than bismuth in the healing of eruptions, condylomas and mucous patches, but mercury-treated cases were considerably slower in becoming Wassermann negative (they were at a disadvantage, however, in that the patients received preponderantly neoarsphenamine for their arsphenamine). Again, there were more than twice as many patients serologically resistant to mercury as to bismuth, but more relapses occurred under bismuth.

Among patients with early syphilis who completed the required first year of regular treatment, there was a larger proportion of satisfactory outcomes in the mercury group than in the bismuth group. The only clinical relapse occurred in a patient treated with bismo-cymol and silver arsphenamine, but the total number of injections received was below the optimum recommended. The only patient who showed a positive spinal fluid after completing a year of regular treatment received mercuric salicylate, silver arsphenamine and arsphenamine in but half the recommended dosage.

In the matter of complications that could be definitely attributed to the heavy metals alone, bismuth was responsible for only half as many as mercury; while of delayed systemic reactions such as dermatitis, jaundice and neuritis, in which both the arsphenamine and the heavy metal may be presumed to have had a part, the mercury group contributed only a little more than half as many cases as the bismuth group.

Thus the differences are not easily weighed and measured, and such differences as appear when the intramuscular injections are given alone, or preceding the first arsphenamine course, tend to become obliterated when an active arsphenamine preparation accompanies the heavy metal from the start. The facts uncovered in the present study suggest that:

1. The salts of both metals have an important place in the antisyphilitic armamentarium. The various preparations selected—both of bismuth and of mercury—appear to have justified themselves in all cases examined in which the treatment was regular and the dosage adequate; but neither metal can compensate for the disadvantage of using an inferior arsphenamine preparation.

2. Mercury gives more brilliant but less uniform results than bismuth, so that in robust patients with a healthy excretory mechanism the body's natural defenses are perhaps more effectively stimulated by the mercurials. For patients less vigorous and for those who do not respond well to mercury preparations, bismuth offers a valuable substitute.

3. Arsphenamine can be counted on to deliver the strongest initial attack against Spirochaeta pallida and acts to best advantage when reinforced by one of the heavy metals; but if for any reason an arsphenamine is contraindicated, bismuth will probably give the better performance alone.

4. For those who would minimize the chances of ill effects and for those who hold that the parasite may become drug fast, alternating the two metals offers an obvious advantage.

VIABILITY OF BACTERIUM TULARENSE IN HUMAN TISSUES

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W. H. H., a white man, aged 49, a master mechanic, dressed a rabbit that had been killed by his son, Jan. 12, 1935. Previously his health had been excellent and his weight had averaged 175 pounds (79.4 Kg.). January 15 he had a severe chill for two hours, followed by high fever and marked loss of strength. The next day he could scarcely speak above a whisper. January 18 a sore appeared on the right third digit near the nail root. The entire arm became painful, and tender swellings developed at the elbow and in the axilla. The temperature was 104 F. and remained so for the next three days. After January 21 he was out of bed, sitting around his home, with moderate fever, little malaise, profound weakness, drenching sweats, and pain limited to the right hand and arm.

January 24 he walked to the office and gave the foregoing history. On examination he was well developed, slightly pallid and obviously ill. His weight was 161 pounds (73 Kg.) and his height 65½ inches (166 cm.). The right pupil was slightly larger than the left. There was a small anterior perforation of the nasal septum. The neck, thorax, heart and lungs were normal. The blood pressure was 100 systolic, 80 diastolic. There were no abnormalities of the abdomen, genitalia or rectum. All reflexes were normal, and the extremities were normal, except the right upper. The dorsal surface of the terminal phalanx of the right middle finger showed an ulcerated, pustular lesion with surrounding purplish engorgement and redness extending up the dorsum of the hand to the wrist. The entire hand was swollen. A very large tender epitrochlear node was felt above the elbow. The overlying skin was desquamating. There was moderate enlargement of the axillary nodes but no other adenopathy. The temperature was 100 F.

The Wassermann and the Kahn reaction of the blood were negative. Smears were negative for malaria. Red blood cells numbered 4.48 millions, with hemoglobin 88 per cent. The white blood cell count was 10,400: polymorphonuclears, 72 per cent; lymphocytes, 25 per cent; transitionals, 3 per cent. There was moderate achromia. The urine was clear, acid, with a trace of albumin, no sugar, a few finely granular and hyaline casts, and bile two plus.

Intradermal injection of deaminized Bacterium tularense suspension gave a moderate positive reaction the next day and a markedly positive one forty-eight hours later. Blood serum agglutination, performed at the National Institute of Health Laboratory, gave partial agglutinations in dilutions 1:10 and 1:20.

January 31, 30 cc. of antitularense horse serum was given by vein. The primary lesion, finger and hand were improved by February 6, but the general condition remained unchanged. Mild serum sickness, with arthralgias of the right ankle and left shoulder occurred, February 9, and lasted for three days. In view of the continued weakness, drenching sweats and loss of weight (to 149 pounds [67.6 Kg.] February 11) it seemed that he should have been given more serum. As it was considered unwise to repeat horse serum in the presence of serum sickness, 20 cc. of antitularense goat serum was given by vein, February 11. An intradermal test made with this serum again gave the characteristic bacterial specific response. Following the second injection of serum the fever subsided promptly and the residual symptoms disappeared. The primary lesions was healed by February 20, and the nodes were less than half their former size. The patient resumed his usual work, March 15, having been disabled for two months. February 16, a serum agglutination test at Washington gave complete agglutination through 1:2,560 dilution. March 23 the epitrochlear node was still enlarged, tender and somewhat painful. The weight was 153 pounds (69.4 Kg.). He had been generally afebrile except for an occasional rise to 99.4 F.

April 18 the right elbow became swollen again, red and tender. This lasted for one week, then subsided spontaneously. May 11 the swelling occurred again. The temperature was

98 F., and the weight was 157 pounds (71.2 Kg.). By May 18 the swelling was sharply localized in the region of the olecranon bursa, accompanied by increased local heat, redness and definite fluctuation. About 6 cc. of bloody, turbid, ropy fluid was aspirated from the bursa and a compression bandage applied. Smears of the fluid showed many red blood cells and lymphocytes, no polymorphonuclears and no bacteria. The fluid agglutinated B. tularense completely through 1:1,024 dilution. A guinea-pig was injected subcutaneously with 2 cc. of fluid, May 21. Each of two blood-cystine-dextrose agar slants was inoculated with several loopfuls of fluid. After three days one slant showed 7 colonies that were typical for B. tularense. Stained smears showed minute gram-negative coccoid and bacillary forms. Dermal inoculation of a guinea-pig with one colony caused death on the fourth day. The autopsy gave results typical for rodent tularemia, and cultures from the heart blood yielded a pure growth of B. tularense. The guinea-pig that had been injected with the bursa fluid died after three and one-half days. The autopsy was typical and the heart blood cultures yielded a heavy growth of B. tularense.

Apart from the mild annoyance of a tender elbow the patient felt well. He remained afebrile and continued to work. He reported again, June 15, and stated that he was as well as he had been prior to the onset of the infection in January. The bursa was still swollen and fluctuant, and overlying tissues were mildly inflamed. Aspiration yielded about 5 cc. of ropy, turbid amber fluid. He was bled again for agglutinins. Serum agglutination was complete for B. tularense through dilution 1:640 and almost complete in 1:1,280. There was no agglutination against Brucella or Proteus OX_{19}. The bursa fluid agglutinated B. tularense completely to 1:512 and partially to 1:1,024. Smears of the fluid (Gram stain and nile blue sulfate stain, as before) showed: lymphocytes, 95 per cent; mononuclear cells, 2 per cent, and polymorphonuclears, 3 per cent. There were few erythrocytes. Along the thicker ropy parts of both smears were scattered bacteria, singly or in groups of from three to five, all minute rods, morphologically and tinctorially indistinguishable from B. tularense. There was no cellular karyorrhexis and no bacteria were seen intracellularly. Two slants of blood-cystine agar were inoculated with the fluid. After forty-eight hours' incubation one slant showed 4 colonies and the other 3 colonies, all typical of B. tularense. Dermal inoculation of a guinea-pig caused typical tularemic death on the fourth day, and pure cultures of B. tularense were recovered from the heart blood at autopsy. Another guinea-pig had been injected subcutaneously with 1 cc. of the bursa fluid. This animal died three and one-half days after injection. Autopsy showed typical rodent tularemia, and pure cultures of B. tularence were recovered from the heart blood.

The patient was seen again, July 15. He had continued to be well. The epitrochlear node never suppurated and was now quite small. The olecranon bursa was still enlarged but no fluctuation was demonstrable. Attempted aspiration gave only a few drops of bloody fluid, possibly not from the bursal cavity. Cultures of this fluid remained sterile and guinea-pig inoculation caused the animal no harm.

While at rest, September 17, the patient was seized suddenly with severe pain in the epigastrium, referred to the precordium and down the left arm. Pain was cramplike, accompanied by nausea and vomiting. It soon disappeared, to recur suddenly and more severely two nights later, at which time it lasted for one and one-half hours. There had been no previous attacks. The temperature varied from 99 to 101 F. for forty-eight hours, and the pulse rate was from 40 to 50 per minute. The white blood cells numbered 6,200, with polymorphonuclears 71 per cent, lymphocytes 29 per cent. The Wassermann reaction was negative. An electrocardiographic tracing showed complete heart block and evidences of coronary disease. The blood pressure was 120 systolic, 80 diastolic. A second electrocardiogram five days later showed normal conduction and a ventricular rate of 90 per minute. For this last information we are indebted to Dr. J. H. Gibbes, who saw the patient during the heart attack and who will report more extensively on the cardiac involvement elsewhere.

COMMENT

We know of four patients who have died abruptly following sudden severe substernal or precordial pain during convalescence from tularemia. Only one had had symptoms of angina prior to tularemic infection. One case, that of a man, aged 36, who died suddenly, came to necropsy and will be reported in detail by K. V. Kitzmiller. The additional burden of tularemic infection, with possible coronary arteriolar endothelial proliferation, is more than hearts previously impaired by atheroma, sclerosis or syphilitic vascular disease can stand. Persons in the atheroma or sclerosis ages should be watched with special care during convalescence from tularemia. Elevated ventricular rates, palpitation and substernal discomfort indicate a need for careful cardiac examination. By doing so the physician and the patient may be forewarned, and appropriate rest or therapeutic measures may be taken to prevent possible impending death. In our patient the anginal symptoms and heart block occurred just eight months after the onset of tularemia.

The unusual feature, to us, was the prolonged presence in pure culture of highly virulent B. tularense within the bursal cavity, associated with signs of regional low grade subacute or chronic inflammation, but without accompanying fever or other symptoms or signs of illness or intoxication. We know of no previous instances of tularemic bursitis and cannot say whether such lesions usually suppurate. In this instance impending suppuration was not apparent. The cellular response was predominatingly lymphocytic, and phagocytic cells appeared late and were extremely few in number. It is possible that specific serum therapy may have aided in maintaining the quiescent status of the bursitis and in preventing the occurrence of systemic symptoms. The increasing natural immunity acquired by recovery may have served similarly.

It is not rare for tularemic infection to lie apparently dormant in certain patients for long periods after what appears to be complete clinical recovery. Residual infection is usually betrayed by sudden reenlargement of some previously involved lymph node. Very rarely late enlargement and suppuration have occurred in nodes not known to have been involved previously. Recurrent adenopathies have appeared as late as one year or more after cessation of all disability but are most frequent during the first four months. In more than half of these cases the nodes suppurate, sometimes with a very slight degree of regional inflammation and often with little or no constitutional reaction. Many of them behave like cold abscesses, and after incision or spontaneous rupture healing is often amazingly rapid and residual abscess is rare. Judged by cultures and animal inoculations the pus is usually sterile. Nodes that suppurate early in the illness are prone to contain viable bacteria.

Viable virulent bacteria have been recovered from other patients late in the disease. Five months after the onset of infection Ryan [1] recovered a pure culture through guinea-pig inoculation with pus from a draining axillary abscess incision. The patient had been afebrile for about three months before the recurrent bubo became apparent. The guinea-pig died on the tenth day after subcutaneous injection. A second animal passage (infected splenic pulp to shaved abdominal wall) caused death in six and one-half days. These survival periods suggest some attenuation of virulence of the strain. Kilbury and Fulmer [2] record recovery of a virulent strain by animal inoculation with ascitic fluid obtained three months after the onset of ulceroglandular tularemia. The acute phase and initial disability

1. Ryan, V. M.: Bacillus Tularense in Lymph Glands Five Months After Infection, Illinois Dept. Pub. H., circular 44, 1933.
2. Kilbury, M. J., and Fulmer, S. C.: Tularemic Peritonitis; Report of Case Observed for Four Years, South. M. J. **24**: 856 (Oct.) 1931.

had lasted for about three weeks. It was only after resumption of work that the patient noticed progressive gradual enlargement of the abdomen. The constitutional symptoms were astonishingly mild despite the tularemic general peritonitis. Disability recurred, however, and it was two and one-half years before normal work could be resumed. Blackford [3] recovered a virulent strain from a proliferative dermal lesion of the arm. Dermal biopsy was made three months after the onset of the disease. Pure cultures of B. tularense were secured by animal inoculation with a macerated piece of the tissue. The remainder of the tissue, sectioned and stained, showed organisms that were morphologically and tinctorially consistent with B. tularense.

Clinical evidence from other patients also points to prolonged suvival of B. tularense in human tissues. Goodpasture [4] saw a recrudescence of severe symptoms several months after the onset of disease in one patient, and a recrudescence with fever for one week occurred in another patient one year after apparent recovery from the acute phase. Francis [5] records the occurrence of febrile relapses, one of six and one of eight days, in two cases of laboratory infection at ten months and at eight months after the onset of disease. Rickman [6] observed a patient who had had many recurrent bouts of fever, with nodal enlargements of the forearm, arm and axilla, over a period of two years. The most recent recurrence, beginning at about the twenty-first month of illness, was ushered in by constitutional symptoms almost as severe as the initial acute phase, with recurrent tender nodes of large size (3 by 5 cm., 2 by 3 cm. and the like). No nodes ever suppurated. Antitularense serum (30 cc. intravenously) effected a sharp reduction in the size of all nodes and caused a marked amelioration of symptoms, but it is not known whether this improvement was permanent. We have also studied a patient with chronic tularemia, a woman whose initial infection occurred in December 1927 and whose diagnosis was confirmed by repeated agglutination tests at the National Institute of Health Laboratory. The acute phase, with temperature to 104 F., lasted for six weeks. An axillary node suppurated in February 1928. Later that year four abscesses occurred, one on a leg and three on fingers. For five and one-half years after the onset she was forced to go to bed for approximately two months out of each year because of fever, malaise, sweats, recurrent adenopathies, profound weakness and mental depression. Antitularense serum (20 cc. by vein) was given sixty-five months after the onset, causing a prompt reduction of fever and transient amelioration of symptoms. No permanent improvement was secured. She is still ill with intermittent symptoms and recurrent adenopathies eight years after the onset of disease.

One of the prominent features of tularemia is the prolonged persistence of agglutinins in the serums of recovered patients. Also, the degree of immunity conferred by recovery is not surpassed by that of any other infection known to us. With the exception of one extremely mild second infection in a heavily exposed laboratory worker, reported by Francis,[7] and recognized as such only because of his exceptional zeal, no second attacks of the disease are known. This seems especially significant, even at present when the total experience with the disease is not great, for the occupational exposure hazard among butchers, market men and game skinners is fairly high. It is inconceivable to us that all the immune persons in this occupational group should have escaped contact with infectious materials or that every disease producing reinfection should have eluded detection during the past decade when accurate recognition of the disease has become widespread, when diagnostic aids of great reliability have been widely available and when disability due to the disease has been compensable in certain states under workmen's compensation acts.

We interpret the permanent persistence of serum agglutinins, the freedom from second attacks and the persistent positive responses to intradermal injections of B. tularense suspensions and to injections of antitularense serum to mean permanent residual living bacteria held in certain tissues in innocuous equilibrium as far as their capacity to produce disease is concerned. Goodpasture [4] has previously expressed this belief in regard to tularemia, and Mooser [8] has adduced strong evidence indicating comparable situations in other infectious diseases. Late relapses and recrudescences indicate a recurring dominance of bacterial activity over the inhibiting factors. Similar conditions seem to obtain only in those infections which usually confer permanent protection after recovery from one attack. The recurrent typhoid abscess of the sternum recently reported by Gannon[9] is interesting in this regard. The recurrent local lesion first attracted attention five years and eight months after apparent complete recovery. Aspiration of the abscess five weeks later gave pus which yielded pure cultures of typhoid bacilli.

Careful studies of animals inoculated with tissues removed at necropsy from recovered tularemia patients who have died from other causes would be extremely useful, and they might confirm the hypothesis of residual living antigen. We have hoped for such an opportunity but, so far, without success. We hope that others to whom it may come will be interested in pursuing it.

SUMMARY

A patient with the ulceroglandular form of tularemia, treated by antiserum, developed tularemic infection of the olecranon bursa three months after onset of the disease and one month after cessation of disability. No constitutional symptoms accompanied the bursitis. Regional symptoms and signs, and the cellular reaction within the bursal fluid, indicated a mild subacute or chronic infectious process. Viable virulent B. tularense was obtained from the fluid by direct cultures and by animal inoculations four months and five months after the onset of illness, corresponding to the second and third months after cessation of all disability. B. tularense was seen in stained smears of one specimen of the fluid. B. tularense can survive in certain tissues of recovered patients for long periods. The ultimate outcome of these bacterial seclusions seems to depend on the solidity of the established bacteriostatic equilibrium.

Tularemic infection is a distinct danger to hearts with preexisting vascular disease.

126 Wellington Place—1512 Marion Street.

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Clinical Notes, Suggestions and New Instruments

ALLERGIC SYNOVITIS DUE TO INGESTION OF ENGLISH WALNUTS

PHILIP LEWIN, M.D., AND SAMUEL J. TAUB, M.D., CHICAGO

Bilateral chronic synovitis or intermittent hydrarthrosis appears in attacks of such striking periodicity that an allergic basis for these attacks is strongly suggested.

In 1924 Miller and Lewin[1] were the first to suggest that idiopathic hydrarthrosis is a sensitization disease, basing their evidence on the satisfactory response of this condition to injections of peptone intravenously.

Judging from the sparse literature since this observation, very little attention has been given to this group of cases, with the exception of Rowe,[2] who reported a case of intermittent hydrarthrosis that proved to be due to food sensitization. Skin tests were mostly negative in this case and the causative foods were determined by means of his elimination diets.

We report a case of intermittent hydrarthrosis of the knee due to ingestion of English walnuts. By allergic synovitis we mean a swelling, hyperemia and overactivity of the synovial membrane manifested by swelling, limitation of motion, increase of free fluid and a feeling of constriction in the joint.

REPORT OF CASE

H. W., a high school boy, aged 16, consulted one of us (P. L.) Jan. 25, 1930, because of stiffness and swelling, which had occurred intermittently for ten years. There had been periods during which the attacks occurred every two or three months. Swelling came on suddenly and disappeared, usually within twenty-four hours. Several joints were loose but none other than the knees became swollen.

The patient did not sneeze and had never had asthma, urticaria or eczema. His father had hay fever and his paternal uncle had hay fever and asthma. His mother had had urticaria from eating tomatoes or strawberries. He was referred to one of us (S. J. T.) for investigation of allergic factors.

It was found that the ingestion of the meats of half a pound of English walnuts was followed within seventy-two hours by a typical attack. Sensitization tests were made, both cutaneous and intradermal, with a positive reaction to English walnuts only. He was advised to avoid all nuts in the diet and to return in four weeks. Within two weeks the swelling and stiffness in the knees had cleared up completely. When the patient reported after an interval of four weeks, both knees appeared normal.

One-tenth cubic centimeter of the patient's blood serum was injected intradermally on the outer aspect of the left arm and 0.1 cc. of 5 per cent dextrose solution was injected in the right arm as a control. The patient was told to eat a liberal amount of English walnuts and to look at both arms at hourly intervals for any sign of swelling, redness or itching over the areas where the injections were made. Within two hours a large wheal with redness and severe itching appeared over the left arm where the patient's blood serum had been injected, while the control arm remained normal.

Three days later he noticed swelling and stiffness in both knees similar to the previous attacks. This condition persisted for five or six days and then gradually subsided. The patient was seen again July 22 and reported that he had abstained from eating nuts and had had no recurrence of synovitis.

COMMENT

The possibility of food allergy should be considered in every case of idiopathic synovitis. A personal or family history of the common allergic diseases, namely asthma, hay fever, urticaria, angioneurotic edema, eczema or migraine, increases the likelihood that some form of sensitization is present.

Food sensitization should be ruled out by subcutaneous and intradermal skin tests, with all the foods entering into the routine diet of the patient. If these food tests are negative, elimination diets should be tried. One of us[3] reported the same type of reaction occurring with peanuts in a child who had eczema and asthma, only in this case the experiment was reversed. A small amount of the child's blood serum was injected into the arm of a nonallergic individual, and when peanuts were eaten he noticed a large hivelike swelling over the injected area one and a half hours later. This type of test was first described by Walzer in fish-sensitive patients. This type of synovitis is frequently due to sensitization of the joint tissues, and foods are probably the main cause.

55 East Washington Street—185 North Wabash Avenue.

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Therapeutics

THE THERAPY OF THE COOK COUNTY HOSPITAL

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CHICAGO

NOTE.—*In their elaboration, these articles are submitted to the members of the attending staff of the Cook County Hospital by the director of therapeutics, Dr. Bernard Fantus. The views expressed by various members are incorporated in the final draft for publication. The articles will be continued from time to time in these columns. When completed, the series will be published in book form.*—ED.

THE THERAPY OF ITCHING (PRURITUS)

IN COLLABORATION WITH DR. THEODORE CORNBLEET

The first principle in the treatment of itching is that scratching must be prevented, for scratching starts and maintains a vicious circle. It damages the skin, and the healing of the damage accompanied by itching again incites scratching. The scratching also inseminates and disseminates infection, which in turn makes the itching worse. Merely telling a patient not to scratch does no good when itching is infuriating, although the explanation as to why he must not may help in making him more cooperative. The patient should have some remedy that will relieve the itching at least as well as the scratching does. So detrimental to healing is scratching that, when the patient, e. g., a babe, is absolutely noncooperative, scratching must be made physically impossible by some form of restraint. For instance, in cases of facial infantile eczema a cardboard tube applied round the elbows in such a way that they cannot be flexed will serve the purpose.

There are two fundamentally different modes of attack in this as well as in any other nerve reaction: first, the lessening of irritation and, second, the lessening of irritability. These two are in inverse proportion of importance. The more completely the irritation can be removed, the less attention needs to be paid to irritability, and vice versa. As they are also complementary to each other, they are often well combined in the therapeutic program: for irritation increases irritability and increased irritability augments the effects of irritation.

LOCAL PRURITUS

From a practical point of view it is not so much the mode of therapeutic attack as the point of attack that might be employed in the classification of available means of treatment: (1) local measures, (2) systemic measures. These are again in inverse proportion of importance. Obviously, when local measures suffice, general measures are not required; and, the less efficient the local treatment, the more are systemic measures required. In general pruritus, systemic treatment is likely to be of greater importance than local therapy and in localized pruritus local treatment is of the greater importance. Often, these two points of attack are usefully combined.

Local Measures.—The ideal remedy for the relief of itching is the removal of the cause. When there is a definite skin disease, the causal therapy indicated is employed; e. g., that of skin infestation (q. v.), of eczema (q. v.) or of urticaria (q. v.).

In anal pruritus, one must look most especially for local rectal pathologic conditions, such as hemorrhoids, fistula or fissure and for ringworm, yeast or bacterial skin infection, and for infestation with pinworms, especially in children.

A vaginal discharge may produce anal pruritus.

Vulvar pruritus may be due to local genito-urinary disease, pregnancy, sexual maladjustment, or the menopause. Any one of the causes of rectal pruritus may give rise to vulvar pruritus. It must be understood, however, that all forms of local pruritus, anal as well as vulvar, may be due to any one of the causes of general pruritus (q. v.).

PRESCRIPTION 1.—*Boric Acid Dusting Powder*

℞ Boric acid ..... 6.00 Gm.
Zinc stearate ..... 30.00 Gm.
Talcum ..... 30.00 Gm.
Apply freely.

Because of the importance of local discharges or infection in maintaining anal and vulvar pruritus, strict cleanliness is the most important measure of hygiene. Thus, it is well to wash the anus after each defecation with 1 per cent dilution of Saponated Cresol Solution and to follow this with thorough drying and a dusting powder (e. g., prescription 1). In vulvar pruritus the liberal powder application should be kept in place by a clean vulvar pad, especially if there is any amount of discharge.

As the removal of the cause may require time and because, even after the cause is removed, its effects tend to persist and as furthermore immediate relief of itching is demanded, remedying the existing pathologic condition is of great practical importance. Itching, like pain—unless purely psychic—is always due to "nutrition minus" of certain nerves; itching is due to "nutrition minus" of the free intra-epithelial nerve endings. This "minus" may be qualitative, as in the poisoning of nerve endings in jaundice or in morphinism and in systemic pruritus in general, or quantitative, as is more commonly the case in localized pruritus as the result of increased tension within the derma, whether this is due to the presence of exudate or of any other disproportion between fluid pressure and epidermal surface rigidity or to the existence of cellular infiltration or of connective tissue overgrowth. If this theory is correct, itching cannot occur without a relatively rigid epidermis and a relatively active blood circulation. Scratching relieves the itching by damaging the epidermis, thus lessening tension. Anything that increases the blood supply increases itching, as does woolen underwear or the removal of clothing at bedtime and the congestion of the skin produced by the warmth of the bed. Accepting this theory as a working hypothesis, one may relieve itching by (1) lessening the blood supply to the skin, (2) soothing the sensory nerve endings, (3) softening the epidermis and (4) depressing the sensory nerves. By a suitable choice or combination of these, any form of pruritus may be relieved, at least temporarily. Most obstinate and difficult to relieve is the itching due to cellular infiltration or to fibrous tissue overgrowth in the derma. Such itching resists other forms of treatment save (5) destruction of the cellular infiltrate or of the affected nerves or tissue. As fibrous tissue overgrowth may become the final state in any case of long standing pruritus, no matter what its origin, the obvious lesson is that itching must not be permitted to become chronic.

1. *Lessening the Blood Supply to the Skin.*—Because the cooling effect of the evaporation of fluid causes vasoconstriction, evaporating applications to the skin are favorite remedies in pruritus; curiously enough, the application need not be cold. Indeed, cold applications that are followed by reactive hyperemia may aggravate rather than relieve itching.

(*a*) Alkaline lotion. Water, applied as hot as can be borne, by bathing, on a compress, or by sponging and then not drying the skin, is a good antipruritic measure because the heat itself is analgesic and because of the succeeding reactionary vasoconstriction which is prolonged by the cooling effect of the evaporation of fluid. Adding alkali, e. g., about 5 per cent of Sodium Bicarbonate, to hot water increases the antipruritic value of this measure, probably by reason of the epidermis softening effect of alkali. To follow this sponging by dusting the still moist surface liberally with Talcum helps by retaining the moisture on the skin, and possibly also by protecting the sensory nerve endings. Adding 0.5 per cent of menthol to the dusting powder (prescription 2) adds a specific nerve-end depressing effect to the entire procedure. Thus, these measures combine the first four mentioned modes of relieving pruritus in one simple attack. This combination is indicated only in those conditions of itching in which the epidermis itself is not damaged, and when there is no tendency to vesiculation.

PRESCRIPTION 2.—*Mentholated Talcum*

℞ Menthol ..... 0.50 Gm.
Alcohol ..... 5.00 cc.
Talcum ..... 100.00 Gm.
Use freely as dusting powder.

PRESCRIPTION 3.—*Menthol-Boric Acid Solution*

℞ Menthol ..... 0.015 Gm.
Boric acid ..... 10.000 Gm.
Water ..... 500.000 cc.
Apply on gauze compress.

(*b*) Isotonic lotions. In conditions in which softening and epidermis-macerating applications are not suitable, as in acute eczema, the addition of from 2 to 4 per cent of Boric Acid (prescription 3) to the water, to make the solution used for the sponging isotonic or hypertonic, overcomes the objection arising from hypotonicity.

(*c*) Astringent evaporating lotions. These are still more suitable for those exudative dermatoses, e. g., "weeping" eczema, in which hot alkaline lotions are contraindicated. When the most acute stage of excessive irritability—which indicates soothing—has passed, compresses of Solution of Aluminum Subacetate diluted 1 to 10 are useful.

2. *Soothing the Nerve Endings.*—For the purpose of soothing the sensory nerve endings of the skin one may use:

(*a*) Calamine lotion, if a drying effect is desired, or (*b*) calamine liniment, if emollient action is aimed at.

PRESCRIPTION 4.—*Phenolated Calamine Lotion*

℞ Phenol, liquefied ..... 0.60 cc.
Calamine lotion ..... 120.00 cc.
Apply freely.

In either case the addition of 0.5 per cent of phenol—the less the better—may increase the antipruritic value of the lotion (prescription 4).

(*c*) Films. These are still more efficient in that they not only protect the skin against the irritation of air and the contact with clothing but also because they

lessen the influx of blood by their pressure and, maybe most especially, because they prevent scratching. The Soft Zinc Glycerogelatin of the National Formulary is not only useful for application as Unna's boot in the treatment of varicose eczema (cf. Therapy of Varicose Veins) but might also be a valuable recourse in other conditions of pruritus. The Paraffin Dressing (cf. Therapy of Burns) may as well be employed in pruritus as in burns. A "drying paste" is useful as a protective varnish on the face in infantile eczema. It may be made more antipruritic, if necessary, by the addition of a small amount of phenol (prescription 5).

PRESCRIPTION 5.—*Phenolated Drying Paste*

℞	Phenol, liquefied	0.50 cc.
	Tragacanth	5.00 Gm.
	Glycerin	2.00 cc.
	Water to make	100.00 cc.

Apply to itching part and permit to dry.

When there are excoriations due to scratching, unguent paste treatment should be employed because of its epithelizing effect. One may use Paste of Zinc Oxide for rather localized patches, or the Soft Paste of Zinc Oxide for more extensive application. In either case final liberal dusting with talcum forms a crust that tends to keep the paste in place.

3. *Softening the Epidermis.*—Softening of the epidermis is especially indicated when the skin is harsh and dry, as in senile pruritus. In this condition, brushing the skin with a soft hair brush while the patient is in a warm alkaline bath (sodium bicarbonate one-fourth pound to the tub) may remove an abundance of harsh dead epidermal scales that contribute to maintenance of the itching. Following this with an inunction of Rose Water Ointment leaves the skin in a much more wholesome condition than it was before.

While ointments are useful when the skin is harsh and dry, they should generally be avoided in pruritus of the anus or vulva, as in these locations they are "messy," macerate the skin, and may aggravate the trouble. It is only when extreme dryness prevails in these parts that the sparing use of salves may be permissible.

4. *Depression of the Sensory Nerves.*—(*a*) By volatile analgesic. This is accomplished by such agents as menthol, phenol and other coal tar derivatives in varying application forms, dependent on the extent of the affliction and the condition of the affected skin. They should be given the patient to be applied in lieu of scratching. The permissible concentration of the analgesic agent depends on the irritability of the surface. When the skin is acutely irritated, they must be employed in great dilution, as they have irritative qualities which may result in aggravation of the irritation and the itching after the nerve depression has worn off. When the skin is not very irritable, they may be employed in considerable concentration, as in the following applications, listed somewhat in order of ascending strength:

PRESCRIPTION 6.—*Menthol-Phenol Ointment*

℞	Menthol	0.30 Gm.
	Phenol	0.60 Gm.
	Rose water ointment	30.00 Gm.

Apply locally as required, and instead of scratching.

PRESCRIPTION 7.—*Menthol-Phenol Lotion*

℞	Menthol	0.30 Gm.
	Phenol	0.60 Gm.
	Alcohol	30.00 cc.

Apply locally.

Menthol and Phenol: Ointment (prescription 6) may be ordered in double strength of the active ingredients unless the skin is quite sensitive. Because it is more cleanly and more easily applied, an alcoholic solution of these (prescription 7) is preferable, if the skin is not in need of an emollient. Menthol had better be omitted in senile pruritus because it may give rise to the complaint of chilliness.

PRESCRIPTION 8.—*Mentholated Coal Tar Lotion*

℞	Menthol	0.30 Gm.
	Glycerin	8.00 cc.
	Solution of coal tar	60.00 cc.
	Solution of calcium hydroxide to make	120.00 cc.

Apply to itching surface.

Coal Tar Solution: Usually ordered to be diluted with nine parts of water, Coal Tar Solution may be employed even in full strength or in the form of the mixture given in prescription 8 if the skin is not damaged.

Pigment: Camphorated Phenol may be employed even in full strength, e. g., in the treatment of anal pruritus, without danger of damage to skin or mucous membrane. It is usually strong enough when mixed with an equal part of Zinc Oxide Ointment (prescription 9).

PRESCRIPTION 9.—*Camphor-Phenol Ointment*

℞	Camphorated phenol	15.00 Gm.
	Zinc oxide ointment	15.00 Gm.

Apply locally as often as required.

(*b*) Infiltration anesthesia. Decided temporary relief may be obtained by infiltration of the affected skin with as much as 75 cc. of 0.5 per cent procaine solution, injecting enough to make the entire region edematous. In some cases a single injection suffices to break in on a vicious circle. In others, the treatment has to be repeated at intervals.

Should the itching return too soon after infiltration with a water-soluble anesthetic, one may take recourse to infiltration with an oil-soluble anesthetic of prolonged action, e. g., Nupercaine (N. N. R.) in the form of Gabriel's solution (1930), which has the formula given in prescription 10.

PRESCRIPTION 10.—*Nupercaine Oil*

℞	Nupercaine (base)	0.50 Gm.
	Phenol	1.00 Gm.
	Benzyl alcohol	10.00 cc.
	Oil of sweet almond to make	100.00 cc.

Dispense in sterile 5 cc. ampules.

Simmons[1] recommends the following technic for pruritus ani: After cleansing the anal region, 5 cc. of this solution is injected under the itching area. One may inject the posterior quadrant on the first visits and the lateral and anterior quadrants on subsequent visits. The finger should be inserted into the anal canal to guide the direction of the needle and avoid penetration of the rectal mucous membrane, which might cause infection. Pooling of the oily solution should be avoided, as it may lead to painful induration. Intradermal injection may lead to a slough. Contraindications to these injections are local infection (eczema) and possibly idiosyncrasy to the drug (if such exists).

(*c*) Division or resection of sensory nerve. The division or resection of the sensory nerve supplying the affected part is the supreme remedy to be employed, when other measures fail to relieve constant and maddening pruritus due to irremediably damaged skin, although excision of the skin may first be tried provided previously employed roentgen therapy in safe dosage has failed. Removal of the affected skin and mucosa is especially indicated when the presence of leukoplakia renders malignant changes a possibility.

1. Simmons, N. J.: Pruritus Ani—A New Treatment, Am. J. Digest. Dis. & Nutrition **2**: 53 (March) 1935; Elimination of Postoperative Pain Following Hemorrhoidectomy, New England J. Med. **214**: 20 (Jan. 2) 1936.

5. *Destruction of Cellular Infiltrate by Radiation Therapy.*—This method of treatment of itching may also act in some other way, as it has also been useful in "essential pruritus." Relief may be obtained from a single exposure to 25 roentgens of unfiltered rays. The treatment may be repeated two or three times at intervals of three or four weeks. More must not be taken, to avoid the induction of erythema. Because of their more limited penetration, grenz rays should be preferable when it is necessary to avoid injury to important organs in or under the skin.

Systemic Measures. — It is important to remember that strictly localized pruritus may be due to systemic causes and cured by proper care of these; also that systemic treatment which acts by lessening irritability may advantageously be combined with the local measures discussed. It is only for purposes of classification that the discussion of these is undertaken under separate headings.

GENERALIZED PRURITUS

Generalized pruritus is said to exist when the condition affects large areas of the body surface. It rarely affects the whole body at one time. As "removing the cause" gives most radical results, this should, of course, always be first attempted.

1. *Causal Treatment.* — The body surface should receive first consideration. Thus, one should always think of scabies and body lice, even in the most genteel.

Excessive dryness of the skin is responsible not only for "senile pruritus" but also for "bath pruritus" and for "winter itch" (pruritus hiemalis). Whenever the skin is dry, the use of soap should be restricted to the hairy parts and the hands and feet. The patient should bathe in the daytime rather than before retiring. Lukewarm rather than hot water should be used for the baths. The skin should be permitted to remain slightly moist after the bath, and a soothing ointment applied immediately after it. Proper moistening of the air of living rooms (between 40 and 60 degrees of relative humidity) is of great importance. Sleeping rooms should be kept cool. Flannel blankets and woolen underwear next to the skin are particularly obnoxious. Cotton or silk undergarments should be worn with a woolen garment over this if desired. Removal to a warm climate during the cold season is, of course, the most radical remedy for the "winter itch."

There is also such a condition as "summer pruritus" due to excessive sweating, and it sometimes occurs as an after-effect of sunburn. Modification of sweating or of skin blood supply (q. v.) may be helpful.

The patient's examination must be all embracing for the practice of causal therapy in pruritus. A partial list of the conditions in which pruritus may be the "presenting symptom" includes diabetes mellitus, liver and kidney disease, disturbances of the gastro-intestinal tract, blood diseases and allergy.

Diabetes mellitus is so important a cause of itching that urinalysis should be one of the first items in the examination of any case of pruritus. It is generally localized at the genitalia, owing to the irritation set up by fermentation of the sugar in the urine, and it disappears promptly when the glycosuria is controlled. Pruritus may also occur in other diseases of metabolism, such as hyperthyroidism, gout or obesity.

Liver and kidney disease are probably next in order. When itching occurs, as it usually does in jaundice, the causal association between the two is obvious. It is possible for liver disturbance to produce itching even without the presence of frank jaundice. In such cases the bilirubin index may be high. Itching may be a distressing symptom of uremia.

Disturbances of the gastro-intestinal tract, such as constipation and indigestion, may be causes.

Blood diseases, especially leukemia, but also chlorosis, may be accompanied by itching.

Allergy to various foods may give rise to or aggravate pruritus. The foods more commonly concerned are shellfish, highly seasoned dishes, cheese, strawberries, tomatoes, pork and sausage. There may be no demonstrable urticaria and, indeed, the itching may occur almost immediately following ingestion of the food. Itching may occur in serum sickness and be an accompaniment of other allergic states, such as hay fever and asthma.

Some drugs tend to give rise to pruritus, particularly opium, belladonna and cocaine; and an untoward reaction to arsenic may first be indicated by itching of the palms and soles. Abuse of coffee, tea, alcohol and tobacco may be responsible for pruritus.

Elimination of the causative factor, when it is not obvious, may be attempted by diet, by favoring bowel evacuations, by diuresis, and even by "washing of the blood."

(*a*) Diet: Abstinence from highly seasoned or fatty foods, strong cheeses, tea, coffee, alcohol or tobacco may be helpful. When allergy is suspected, test diets (see Therapy of Urticaria) are indicated. An exclusively milk diet relieves all other forms of dietary allergy, excepting of course that due to milk, which would be aggravated by it.

(*b*) Bowel evacuation: Saline or alkaline saline catharsis, if there is a tendency to colon stasis (q. v.), should not be omitted from the therapeutic program.

(*c*) Diuresis: Cool retention enemas of 1 or 2 liters of 2 per cent solution of Sodium Bicarbonate given morning and evening may improve conditions, especially in jaundice.

(*d*) "Washing of the blood": Removing from 150 to 250 cc. of blood by vein puncture and injecting from 200 to 300 cc. of Physiologic Solution of Sodium Chloride may not so much act by actual removal of poison as by an "alterative" influence.

2. *Modification of Sweat Secretion.*—As not only deficient but also excessive sweat secretion may produce itching, it is not surprising that Pilocarpine Nitrate (8 mg.) as well as Atropine Sulphate (1 mg.) have been advocated in the treatment of pruritus. Even when the condition of the skin does not obviously indicate the one or the other, a trial of a hypodermic injection of either one may be worth while in certain cases, with continuance of oral administration of the dose that gives maximum benefit with a minimal side effect. Addition of the helpful agent to other medication may have a potentizing effect.

3. *Modifications of the Blood Supply.*—(*a*) Epinephrine. The almost magic effect of the intramuscular injection of Solution of Epinephrine Hydrochloride (0.5 cc.) in the therapy of allergic urticaria justifies its trial in allergic pruritus as well as in other forms in which a diminution of the skin blood supply seems indicated.

(*b*) Ergotamine tartrate. In a dosage of 1 mg. orally three times daily for several days, ergotamine tartrate has been especially recommended for pruritus of hepatic or renal origin. Several doses are required before the effect is noted; but then the pruritus may

not recur after discontinuance of the drug. Its use must not be continued indefinitely, owing to the danger of ergotism.

(*c*) Nitrites. These have been found useful in certain cases of general (not localized) pruritus. That vasodilation may be useful in pruritus need not be surprising when one thinks of pruritus as due to "nutrition minus" of skin nerves engendered by excessive intradermal pressure. The lowering of systemic blood pressure may lessen the intradermal tension at the same time as the blood supply to the skin is increased. The relief obtainable from vasoconstrictors, on the other hand, may be assumed to be due to the lessening of intradermal tension by diminution of the blood supply. Tablet of Glyceryl Trinitrate, now official in an average dose of 0.6 mg., dissolved under the tongue, has given relief within five minutes and for from one to two hours. Diluted Erythrityl Tetranitrate (erythrol tetranitrate) in doses of 0.03 Gm. may give within half an hour relief that may last for five or six hours. As the relief of the itching occurs simultaneously with the blushing of the skin and the congestion in the head, one may know that, when relief is not experienced at the onset of these symptoms, the nitrites are not of any use in the particular case. Habituation, which develops after several days and interferes with continuance of the antipruritic action, requires discontinuance of the drug for possibly two days to secure the return of effectiveness.

4. *Influencing of the Central Nervous System.*—The fact that pruritus is akin to pain is well brought out by the fact that analgesics are also, in general, antipruritics. Opiates are a notable exception to this proposition. They are particularly prone to induce or aggravate itching.

(*a*) Acetylsalicylic Acid in doses of 0.30 Gm. in capsule or tablet form may be given every two to four hours as required. If it is not well borne, on account of diaphoresis, one of the coal tar analgesics such as Aminopyrine (0.30 Gm. capsules or tablets) may serve as a succedaneum.

PRESCRIPTION 11.—*Bromide*

℞ Potassium bromide ..... 30.00 Gm.
Anise water ..... 30.00 cc.
Syrup of glycyrrhiza.....to make 120.00 cc.
A teaspoonful or two in milk after meals and at bedtime.

PRESCRIPTION 12.—*Bromide and Cannabis*

℞ Sodium bromide ..... 8.00 Gm.
Fluidextract of cannabis..... 1.00 cc.
Iso-elixir.....to make 120.00 cc.
Tablespoonful in water every four hours.

(*b*) Bromide in 1 to 2 Gm. doses (prescription 11) may lessen nervous irritability. The combination of bromide with cannabis (prescription 12) is synergistic

PRESCRIPTION 13.—*Phenobarbital and Acetylsalicylic Acid*

℞ Phenobarbital ..... 0.50 Gm.
Acetylsalicylic acid ..... 5.00 Gm.
Divide into fifteen capsules.
One as required at bed time.

in pruritus in that the latter adds a psychic alterative action to the depressant effect of the bromide.

(*c*) Hypnotics, e. g., as phenobarbital (0.1 Gm. tablet), should be included in the therapeutic program when itching is worse at night or when it interferes with sleep. As a general rule, when a hypnotic is used alone in sleeplessness due to itching, it must be given in large doses: hence it had better be combined with an analgesic (prescription 13).

(*d*) The therapy of psychoneurosis (q. v.) is required in proportion to the dominance of neurosis; but every patient with pruritis needs some psychotherapy. Knowing that "everybody itches more or less" may not be much consolation to one who is driven frantic by itching. It may, however, help some others to bear their affliction with more equanimity. Most especially must pruritus sufferers have driven into their minds the injunction "not to scratch," and to make this possible is the alpha and omega of pruritus therapy.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS. HOWARD A. CARTER, Secretary.

HOGAN SUPER-BREVATHERM SHORT WAVE DIATHERMY UNIT, MODEL 8898 ACCEPTABLE

Manufacturer: McIntosh Electrical Corporation, Chicago.

This unit is designed to produce undamped electric current oscillations of high frequency which are suitable for the production of heat within the body tissues, for surgical tissue cutting and for hyperpyrexia.

The apparatus is mounted in a wooden cabinet, all component parts being accessible for inspection and repairs. The circuit is of a well known two-tube type, with the two oscillator tubes connected in opposite phase relation. The plate circuits are supplied with direct current, which is obtained from a two-tube mercury vapor rectifier. Two oscillator and two rectifying tubes are employed in this unit.

The patient's circuit is inductively coupled to the plate or output inductance of the oscillator tubes. A variable condenser of the split stator type is used to tune the patient's circuit into electrical resonance with the oscillator. Sufficiently loose coupling between the plate inductance and the inductance of the patient's circuit prevents overload conditions of the tubes. For the regulation of the power output, the primary winding of the plate current transformer is equipped with taps to vary the input current. Under maximum load the power input is about 1,500 watts. Since there is no acceptable method for measuring the output of short wave machines, this value is not stated. A thermocouple amperemeter indicates the relative power output, and maximum readings indicate electrical resonance between oscillator and patient's circuit. The wavelength is approximately 21 meters.

Hogan Super-Brevatherm Short Wave Diathermy.

The temperature rises of the transformers, after the machine was operated at full load for two hours, came within the limits of safety prescribed by the Council. Both cuff and pad electrodes are furnished as standard equipment. The shipping weight of the unit is about 200 pounds.

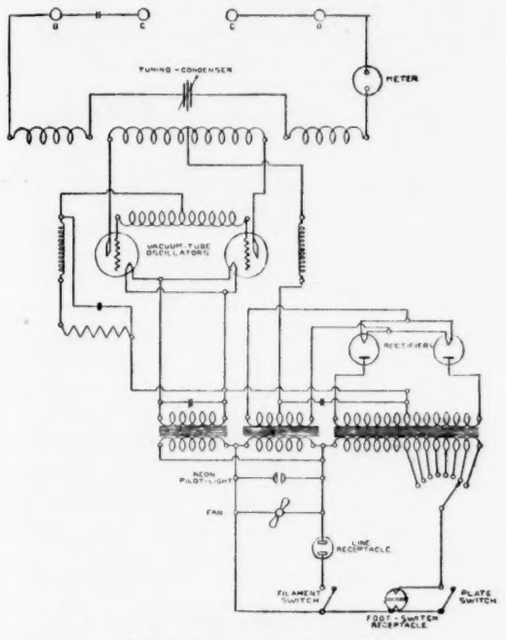
At the request of the Council the machine was investigated and the data submitted for consideration. The tissue heating effect in the human thigh was observed. Cuff electrodes were applied to the thigh: one posterior to the hip, the other anterior to the knee. Thermocouples were introduced into the deep-lying tissues and also into the subcutaneous tissues. They were placed at a point midway between the hip and the knee, or midway between the cuff electrodes, and removed during the time of treatment. After twenty minutes' treatment, the machine being operated at the patient's tolerance, the temperature rise and final temperature (average of five tests) were observed to be somewhat higher than those temperatures obtained by conventional diathermy, which was used as a control. The conventional diathermy currents were applied to the thigh by tinplate electrodes, one on the medial and one on the lateral aspect.

The cuff electrodes used in the investigation were made of metal surrounded by thick protecting felt and enclosed in a

sateen bag. Several layers of toweling, a felt pad, or both materials, were placed next to the skin to absorb perspiration.

Burns may be produced by this machine, but they may be avoided by ordinary precaution; their likelihood to occur is much less than with conventional diathermy.

This unit was tested in a clinic acceptable to the Council, and there the reports of the investigation were confirmed, and



Schematic diagram of circuit.

the machine was considered as giving satisfactory service for the purpose for which it is intended.

In view of the favorable report of the machine, based on its performance when cuff electrodes were used, the Council on Physical Therapy voted to include the Hogan Super-Brevatherm Short Wave Diathermy Unit, Model 8898, in its list of accepted apparatus.

SPENCER SUPPORTS ACCEPTABLE

Manufacturer: The Spencer Corset Company, Inc., New Haven, Conn.

Spencer belts, corsets with built-in supports, and bandeaux are recommended by the manufacturer for the following indications: enteroptosis, hernia, sacro-iliac sprain, movable kidney, pregnancy and post partum, postoperative support, and breast conditions. These supports are made for men, women, children and infants.

All Spencer supports, declares the firm, are constructed of nonelastic material and are made to order according to the information submitted by corsétières, the saleswomen for the company. This information consists of a description and measurement of the figure. The boning in Spencer supports is of special steel covered with a material claimed to be impervious to moisture. This boning is called Spencerbone, because it is manufactured exclusively for the firm and from its own formula.

Spencer Abdominal Corset.—A corset combined with a supporting section of fabric of proper stiffness, of a size and shape appropriate to the needs of the patient, which is worn inside the corset and adjusted from the outside by means of straps which emerge through slots. Each strap adjusts independently and permits varying degrees of pressure from the bottom to the top of this inner supporting section. Pressure and uplift, according to the firm, can be secured in any amount which the patient can tolerate. Especially designed padding can be used under any part of the section to give local pressure to whatever degree desired. The straps engage with flat buckles so located on the outside of the corset as to bring the strain of the abdominal uplift on the pelvic girdle.

Spencer Abdominal Belt.—A garment designed to do the same work as the Spencer Abdominal Supporting Corset; but, unlike the corset, this abdominal belt is made of a corset back section coupled only to a somewhat larger abdominal supporting section by means of straps and buckles which operate the same as for the corset.

Spencer Sacro-Iliac Corset.—A combination corset with an inner belt, which encircles the pelvic girdle and emerges at the front. According to the company, it can be adjusted to varying degrees of pressure by means of straps and buckles. This inner band is adjustable independently of the corset and can be tightened to any desired degree. The corset's particular function is to keep the band from sliding up and out of place on the figure.

While this band is commonly fitted with a pad of proper shape which, when adjusted, rests over the sacrum, different sizes and shapes are made as ordered by the physician.

Spencer Sacro-Iliac Belt.—This belt is similar to the Spencer Abdominal Belt, except for the narrow pad and band fitted and adjusted to it. The purpose of it is to hold the sacro-iliac band in place on the figure.

Buckle Front Corset for Back Support.—This garment, states the manufacturer, is used when a fair degree of immobility of that part of the spine which it can control is desired. It is fitted with rigid or semirigid steels for each side of the spine. The garment is fitted with strong adjustable shoulder straps which, coming up from the back, pass over the shoulder and under the arm, fastening far enough back to limit the motion of the shoulders. Steels of lighter weight are used at the sides and front.

Spencer Belt for Inguinal Hernia.—A belt, according to the firm, which will control small, easily reducible, inguinal hernias. The belt itself provides support and uplift. Perineal straps are adjusted to cloth tabs attached to the bottom edge of the front part of the belt. Attached to these cloth tabs are firm, softly finished pads, placed to give the necessary pressure on the opening.

Spencer Maternity Corset.—An especially designed corset with lacers at front, back, and sides to provide for changes in the figure during pregnancy. It is designed either with or without the inner abdominal support.

Spencer Maternity Belt.—A Spencer abdominal belt, with an additional back lacer adjustment which provides for figure changes.

Style 400 Bandeau.—A bandeau designed to give bust support and uplift. Bust pockets are made of slightly stretchy material, shaped to provide uplift without constriction. Material below bust does not stretch. Made to the patient's bust and waist measurements.

Style 700 Bandeau.—A bandeau made of soft material, firm enough to provide bust support and uplift. Made to patient's bust and waist measurements.

Style 800 Bandeau.—A bandeau made of soft material, firm enough to give bust support and uplift. Suitable for those preferring a short bandeau.

Pads.—Pads which supply specific local pressure are made to sizes and thicknesses as specified by the physician.

According to the Spencer Corset Company, these supports are sold through their sales representatives (women), known as Spencer corsétières. The corsétières are not permitted to diagnose; they are required to cooperate with the physician by fitting the type of support he prescribes. They are also instructed to arrange for the physician's inspection of a completed and fitted garment, whenever it is possible. All garments are designed for the individual patient. The company claims that no stock garments are made or sold.

The Spencer Corset Company has informed the Council that it has never paid commissions or rebated any percentage of the selling price to physicians on any of its merchandise, and assures the Council that it will not do so in the future. Furthermore, the manufacturer has stated that the corsétières are under instructions not to pay commissions or gratuities of any kind and that any violation of this rule would cause them to lose their franchises.

These garments were examined by a consultant who has had a large experience with such supports. He reported that the supports gave satisfactory service.

The Council therefore voted to include the Spencer Supports in its list of accepted devices.

Council on Pharmacy and Chemistry

REPORTS OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT.

PAUL NICHOLAS LEECH, Secretary.

ANDROSTINE-CIBA NOT ACCEPTABLE FOR N. N. R.

Under the name "Androstine" the Ciba Company has been promoting three preparations, all claimed to be testicular extracts. Circulars recently distributed to the medical profession make many extravagant and unwarranted claims for this product; the Ciba Company has not submitted the product for the Council's consideration, and this report is made on the Council's own initiative.

According to the recent advertising, Androstine is represented to be

"a total testicular extract . . . composed of two fractions, the hydrosoluble, which contains the active principles of the spermatic gland, and the liposoluble, extracted from the interstitial gland."

It is claimed that

"The administration of Androstine to castrated animals provokes certain reactions, of which the most important is the increase in size of the capon's comb: this is the reaction employed for the standardization of Androstine."

Although the firm implies that Androstine is standardized by the capon comb-growth reaction, the marketed solutions are described as representing, in the combined contents of one ampule "A" (hydrosoluble) and one ampule "B" (liposoluble) (each 1.5 cc.), "the active hydrosoluble and liposoluble principles contained in 16 grams of fresh gland." There is no statement of potency in capon units. In addition to the ampules the firm markets tablets each claimed to represent "the active hydrosoluble and liposoluble principles contained in 8 grams of fresh gland."

The claimed indications for Androstine are:

"Testicular insufficiency, prostatic hypertrophy, impotence, infantilism, premature senility, obesity of endocrine origin, climacteric of man, prostatism, neuroses and psychoses of genital origin."

It is claimed further that:

"Androstine stimulates basal metabolism and relieves nervous and psychical troubles of sexual origin."

The prescribed dosage for these conditions is "3 to 8 tablets a day . . . or the contents of one ampule injected intramuscularly, using ampules A and B alternately."

A competent investigator communicated to the Council the results of assays made on both injectable forms of "Androstine." The investigator reported (in part) as follows:

"We gave each caponized rooster the amount recommended for one week's treatment of humans and obtained no increase in comb growth. Therefore I think we can say that both of their fractions, as supplied to us, contain less than one cock unit per 3 cc. of substance."

The following more detailed statement was submitted later:

"Of the ampules of Androstine which we had we made the following tests:

"The first set of capons were each injected with 1.5 cc. of ampules A and B on alternate days for six days. The reaction obtained was less than 1 cock unit. Another group were each given 4.5 cc. of ampule A in 3 divided doses. The same thing was done with ampule B. In both of the latter instances no reaction occurred. Therefore we had no evidence from our assay that there was any appreciable amount of male hormone in the doses prescribed."

It appears, therefore, that Androstine-Ciba is practically inactive with respect to its content of comb-growth-stimulating substance. As the latter principle is the only substance in testis extracts known at present from which any essential physiologic effect or possible therapeutic benefit might be obtained, the claims made for Androstine-Ciba are obviously unwarranted. Even if Androstine actually contained an appreciable amount of testis hormone, the clinical use of this principle is so poorly established that the claims made by the Ciba Company would still be unsupported by adequate evidence.

The Council declared Androstine-Ciba unacceptable for N. N. R. because it represents an irrational combination of inactive preparations, marketed with unwarranted and misleading claims.

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

PAUL NICHOLAS LEECH, Secretary.

DIGIFOLINE-CIBA (See New and Nonofficial Remedies 1935, p. 165).

The following dosage form has been accepted:

Ampules Digifoline-Ciba, 2 cc.—Each ampule contains 2 cubic centimeters, representing Digifoline-Ciba equivalent to 0.1 Gm. (1½ grains) of digitalis leaves. The product is standardized by the Hatcher and Brody cat method so that each ampule represents one cat unit. It contains neither alcohol nor glycerin.

BISMUTH SODIUM TARTRATE-SEARLE (See New and Nonofficial Remedies, 1935, page 122).

The following dosage forms have been accepted:

Ampoules Bismuth Sodium Tartrate-Searle, 3 per cent, 2 cc.—Bismuth Sodium Tartrate-Searle, 0.060 Gm.; benzyl alcohol, 0.040 Gm., and sucrose, 0.50 Gm., in distilled water to make 2 cc.

Solution Bismuth Sodium Tartrate-Searle, 3 per cent, 60 cc. vial.—An aqueous solution containing in each 2 cc. bismuth sodium tartrate-Searle, 0.060 Gm.; benzyl alcohol, 0.040 Gm., and sucrose, 0.50 Gm.

CORRECTION

Refined and Concentrated Antipneumococcic Serum Type VII-Lederle.—In the preliminary report of the Council (THE JOURNAL, May 2, p. 1564), first paragraph, last sentence of the paragraph, the statement ". . . type VIII includes a typical type III" should read ". . . type VIII includes atypical type III."

Committee on Foods

VITAMIN D MILK

THE RELATIVE VALUE OF DIFFERENT VARIETIES OF VITAMIN D MILK FOR INFANTS: A CRITICAL INTERPRETATIVE REVIEW

PHILIP C. JEANS, M.D.
IOWA CITY

(Concluded from page 2069)

CLINICAL OBSERVATIONS

In the abstracts that follow, the quantities of vitamin D are stated in terms of U. S. P. or International units. In most instances conversion from other unitage statements has been necessary. It is to be recognized that conversion factors are to some extent arbitrary and that the results by the older methods of assay vary in different laboratories. The variations are presumably due to factors beyond the control of the most careful experimenters and may be so great as to lead to the conclusion that the older methods are inaccurate. No doubt some of the confusion that now exists concerning the relative values of vitamin D from different sources is dependent on the inaccuracies of assay of this vitamin by the older methods.

Daniels, Stearns and Hutton,[22] 1929: This was an inpatient balance study in which slightly better retentions of calcium and slightly poorer retentions of phosphorus were obtained with irradiated milk than with 5 cc. of cod liver oil. The authors conclude that cod liver oil in the amount used was less effective than irradiated milk. It is the reviewer's interpretation that the retention values represent a low vitamin D intake for both the cod liver oil and the irradiated milk groups. Calcium retentions of from 35 to 39 mg. per kilogram are about what may be expected from approximately

22. Daniels, Amy L.; Stearns, Genevieve, and Hutton, Mary K.: Calcium and Phosphorus Metabolism in Artificially Fed Infants, Am. J. Dis. Child. **37**: 296 (Feb.) 1929.

135 units of vitamin D and the milk intake stated,[16] and considerably less than approximately 50 mg. per kilogram to be expected when from 340 to 350 units (one teaspoonful of cod liver oil) is given.[23] In the study under consideration the potency of none of the vitamin D preparations was determined. The milk was irradiated under a quartz lamp for a period sufficient to have a strong flavor develop, and the cod liver oil was an unrefined product purchased especially because of crudeness.[24] No conclusions can be drawn from this study for the purpose of this review.

Barnes, Brady and James,[25] 1930: In an outpatient study, rickets was cured or prevented in 95 per cent of sixty-four babies receiving 840 units of vitamin D daily as cod liver oil. At the end of the study, 98 per cent of the babies were either well or benefited. Rickets was cured or prevented in only 44 per cent of fifty-seven babies receiving 750 units of vitamin D as irradiated ergosterol. The results in the latter group "were not significantly better than those for the control group of untreated subjects." The cod liver oil and viosterol used were assayed for vitamin D content. Roentgenograms and serum calcium and phosphorus were the criteria. Lack of cooperation is stated for the mother of one of the two babies who developed rickets on the cod liver oil regimen.

De Sanctis and Craig,[26] 1930: This study is difficult to interpret because the potency of the cod liver oil was only estimated and rickets was diagnosed entirely by means of clinical signs. With viosterol at a daily level of 810 units of vitamin D, rickets developed in 23 per cent of the babies. With cod liver oil at an estimated vitamin D level of from 380 to 460 units of vitamin D daily, rickets developed in 3 per cent of the babies. Subsequent reports by the same authors give essentially the same type of results.

Hess, Lewis and Rivkin,[27] 1930: In this preventive study sixty infants from 4 to 12 months of age and housed in an institution were given 10 or 20 drops daily of viosterol in oil, beginning in the autumn and ending in March. It is estimated from data given by Bills[28] that 10 drops of viosterol in oil contained 2,860 units. The babies were outdoors almost daily. The proportion of infants receiving either dosage is not stated. The criteria were physical examinations from time to time and roentgenograms and calcium and phosphorus levels in the blood at the end of the study. The authors state that the type of disorder generally recognized as rickets was almost completely prevented but that as judged by the more refined methods the protection was not absolute. Of the entire group, ten developed mild rickets; two of these received 10 drops of viosterol in oil and eight received 20 drops. When the cases of clinical rickets are excluded and only those with roentgenographic rickets are considered, there remained three infants with slight rickets and one with slight to moderate rickets, all having received 20 drops of viosterol in oil. The authors conclude that the dosage employed in this study (5,700 units) was inadequate.

The baby with slight to moderate rickets after the ingestion of 20 drops daily of viosterol in oil for two and one-half months was given six teaspoonfuls of cod liver oil daily. Slight healing was noted in ten days and complete healing in three weeks. The authors state that the 20 drops of viosterol in oil were equivalent to ten teaspoonfuls of cod liver oil on a rat unit basis. In this instance rapid healing was produced by approximately 2,100 units as cod liver oil in an infant whose rickets developed while he was receiving approximately 5,700 units as viosterol.

Hess, Poncher, Dale and Klein,[29] 1930: Viosterol in oil (286 units to the drop[28]) was administered in an outpatient preventive experiment to fifty-one infants in doses of 1, 2, 3, 5, 10, 15 and 20 drops daily. Cod liver oil was given to forty-one infants in doses of 1, 2 and 3 teaspoonfuls and 2 tablespoonfuls daily. The prematurely born infants of the study are excluded from this discussion. The only infant of the entire group who developed roentgenographic rickets was one of seventeen receiving two teaspoonfuls of cod liver oil daily. A distaste for cod liver oil was noted in this case. It is stated that ten drops of viosterol in oil (2,860 units) was the smallest dose that prevented a fall in both the calcium and the phosphorus of the blood from the first to the later months of the first year of life. This amount is stated as the minimum dose for prophylaxis.

Apparently the lowering of the blood values for calcium and phosphorus represented variations within the normal range, in some instances the later values being slightly less than earlier ones, but still good values. Roentgenographic rickets did not develop in any of six infants receiving one drop of viosterol in oil (286 units) or in any of seven infants receiving one teaspoonful of cod liver oil (approximately 350 units[28]), while rickets was evident in nine of thirty-four control infants.

Hess, Lewis, McLeod and Thomas,[30] 1931: This was an outpatient preventive and curative study of milk from cows fed irradiated yeast and from cows fed irradiated ergosterol. Roentgenograms were used as the criterion. Each variety of milk was produced at levels of 215 and 430 units of vitamin D to the quart and was fed to four groups of infants at a constant level of approximately 24 ounces daily. The vitamin D intake was approximately 160 and 320 units daily. The study group consisted of infants from 1½ to 6 months of age and the observations were made from January to March inclusive. "Thirty-three of the infants had previously been getting cod liver oil, twenty-three of the preventive group and ten of the rachitic group, but this was discontinued, although the amounts were so small as to be inconsequential." The data for the preventive study are not given, but it is stated that rickets was prevented in all infants except two of an unstated number receiving 160 units daily as "yeast milk." Prevention was successful with 160 units as "viosterol milk" in an unstated number of infants, in sixteen infants receiving 320 units as "yeast milk" and in seventeen receiving 320 units as "viosterol milk." The curative study group included thirteen infants; three

23. Jeans, P. C., and Stearns, Genevieve: Growth and Retentions of Calcium, Phosphorus and Nitrogen of Infants Fed Evaporated Milk, Am. J. Dis. Child. **46**: 69 (July) 1933. Nelson, Martha, V. K.: Calcium and Phosphorus Metabolism of Infants Receiving Undiluted Milk, ibid. **42**: 1090 (Nov.) 1931.

24. Personal communication from one of the authors.

25. Barnes, D. J.; Brady, M. J., and James, E. M.: The Comparative Value of Irradiated Ergosterol and Cod Liver Oil as a Prophylactic Antirachitic Agent When Given in Equivalent Dosage According to Rat Units of Vitamin D, Am. J. Dis. Child. **39**: 45 (Jan.) 1930.

26. De Sanctis, A. G., and Craig, J. D.: Comparative Value of Viosterol and Cod Liver Oil as Prophylactic Antirachitic Agents, J. A. M. A. **94**: 1285 (April 26) 1930.

27. Hess, A. F.; Lewis, J. M., and Rivkin, Helen: Newer Aspects of the Therapeutics of Viosterol (Irradiated Ergosterol), J. A. M. A. **94**: 1885 (June 14) 1930.

28. Bills, C. E.: Physiol. Rev. **15**: 1 (Jan.) 1935.

29. Hess, J. H.; Poncher, H. G.; Dale, M. L., and Klein, R. I.: Viosterol (Irradiated Ergosterol). J. A. M. A. **95**: 316 (Aug. 2) 1930.

30. Hess, A. F.; Lewis, J. M.; MacLeod, Florence L., and Thomas, B. H.: Antirachitic Potency of the Milk of Cows Fed Irradiated Yeast or Ergosterol, J. A. M. A. **97**: 370 (Aug. 8) 1931.

in each of the two groups receiving "yeast milk" and two and five infants respectively in the groups receiving 160 and 320 units as "viosterol milk." In two of the three infants receiving 160 units as "yeast milk" the rickets became worse for a period of from one to two months before signs of healing were noted. In all other infants healing was marked or complete at the close of the experiment. No difference is noted between the 160 and the 320 unit "viosterol milk" groups or between either of these groups and the 320 unit "yeast milk" group. Accurate comparison of the relative values of these two varieties of milk does not seem possible. Inferiority of 160 units as "yeast milk" is indicated.

Wyman and Butler,[31] 1932: This was an inpatient curative study of two infants and two children with advanced active rickets. They were kept for a control period of from ten to twenty-three days without antirachitic agents. Serum calcium and phosphorus and roentgenograms were used to determine the amount of healing. During the experimental period the only antirachitic agent used was from 32 to 40 ounces of "yeast milk." The unitage of the milk is not stated, but a succeeding article [32] reports the potency at 430 units to the quart. One of the four subjects showed some small degree of healing in the control period. This child was given pasteurized "yeast milk" and later "yeast milk" boiled for five minutes. The rate of healing was increased over that of the preliminary period. The remaining three children showed evidence of deposition of bone demonstrable by roentgenograms within two weeks of beginning treatment. The authors conclude that "yeast milk" is an effective source of antirachitic substance.

Hess and Lewis,[33] 1932: The study group consisted of ninety-eight infants from 1½ to 6 months of age, mostly Negroes. A few of the babies were in an orphanage, but the majority were outpatients. The study was both preventive and curative and was carried on from January to April. The criterion was roentgenograms. The babies received from 24 to 32 ounces of irradiated milk daily, containing 135 units of vitamin D to the quart. The preventive study concerned thirty-six infants, including one prematurely born, without roentgenographic evidence of rickets at the beginning of the study. Of the remaining sixty-two infants, fourteen had roentgenologic evidence of rickets and forty-eight had clinical signs of rickets without roentgenologic changes. All the infants with roentgenologic evidence of rickets showed signs of healing within from four to six weeks; four of these had not healed completely at the end of the experiment. In the ten cases in which the rickets healed, the average time for healing was fifty-five days. In the discussion of the preventive experiment the authors mention the occurrence of rickets in only the prematurely born baby. The authors conclude that irradiated milk is highly satisfactory both from a prophylactic and from a curative point of view. An examination of the tabular data reveals that in addition to the prematurely born baby, two others (E. H. and P. U.) developed rickets six weeks and two months after the start of the experiment. Because of these two cases the conclusion would seem warranted that irradiated milk was not completely protective against rickets even for full term infants.

Gerstenberger and Horesh,[34] 1932: Two hospitalized rachitic infants were fed 500 cc. daily of vitamin D milk produced by feeding Holstein cows 540,000 units of vitamin D daily as irradiated ergosterol. The unitage of the milk was not stated, but the fat of the milk contained 6.75 units per gram. Assuming that the milk had a fat content of 4 per cent, it may be estimated that the infants received 135 units daily. The vitamin D milk was supplemented with ordinary skimmed milk. These two infants had slight evidences of healing as shown by roentgenograms in three and four weeks respectively, but the process had not healed when the experiment was forced to close after ten and eleven weeks. The blood phosphorus had not reached a normal value in either child by ten weeks. It seems fair to conclude that the level of vitamin D fed approached closely or was below the minimum curative dose.

Mitchell, Eiman, Whipple and Stokes,[35] 1932: This was a study of irradiated milk and milk from irradiated cows, conducted from February to October. The babies were admitted to the study from February to April and each baby was studied from six to eight months. The infants were kept indoors except for three months in the summer, when they were outdoors for two hours daily in a low-roofed, screened pavilion so placed with reference to surrounding buildings that no direct sun touched it and skyshine was also excluded. All antirachitic agents were excluded for six weeks before the experiment. The irradiated milk used contained 175 units to the quart as determined by assay of the separated fat. The irradiated milk group consisted of thirteen infants with no roentgenologic evidence of rickets. Roentgenograms were made at regular intervals, but only the final results (October) are recorded. The tabulated data show two children with mild and one child with moderate rickets, all healed. It is stated also that "a small group of markedly rachitic infants have been treated in the ward of the University and Children's Hospitals with irradiated milk as the only antirachitic agent. Prompt healing has occurred in each instance."

The milk from irradiated cows contained 60 units of vitamin D to the quart as determined by assay of the separated fat. The experimental group included twenty infants with no roentgenologic evidence of rickets and one with moderate rickets. The tabulated results of the preventive experiment show three infants with mild and three with moderate rickets, all healed. In the curative experiment the rickets healed, though slowly. The amount of vitamin D received by this group is not stated, but the statement is made that the 95 to 110 units which the youngest babies in the 1932 study of Hess and Lewis must have received is not far in excess of the number of units administered to this group of twenty-one infants. The authors state that the twenty infants of this preventive study were protected.

The authors say: "It is customary in the institution to give from one-half to one teaspoonful of cod liver oil daily and among the older infants and young children the presence of moderate rickets is seen frequently, and severe rickets occasionally." It would be most interesting if this observation were confirmed by a controlled experiment.

On the basis of the data given, the conclusion seems justifiable that neither of the milks studied was completely protective. Evidently rickets developed in both

31. Wyman, E. T., and Butler, A. M.: Antirachitic Value of Milk from Cows Fed Irradiated Yeast, Am. J. Dis. Child. **43**: 1509 (June) 1932.
32. Wyman, E. T.: New England J. Med. **209**: 889 (Nov. 2) 1933.
33. Hess, A. F., and Lewis, J. M.: Milk Irradiated by the Carbon Arc Lamp, J. A. M. A. **99**: 647 (Aug. 20) 1932.
34. Gerstenberger, H. J., and Horesh, A. J.: J. Nutrition **5**: 479 (Sept.) 1932.
35. Mitchell, J. M.; Eiman, John; Whipple, Dorothy V., and Stokes, Joseph, Jr.: Am. J. Pub. Health **22**: 1220 (Dec.) 1932.

groups and was healed by October. The reviewer is leaving out of consideration any possible influence indirect summer sunshine may have had, and the unusually high vitamin D unitage of the irradiated milk.

Barnes,[36] 1933: This was an outpatient curative study, roentgenograms being used as the criterion, in which milk fortified with 400 units of a vitamin D concentrate (Vitex) to the quart was given as the sole antirachitic agent in treating fifteen rachitic infants. The amounts of vitamin D ingested were from 300 to 400 units daily. All the infants recovered promptly. No individual data are given. From this study it may be concluded that cod liver oil concentrate milk with 400 units to the quart will bring about complete healing of rickets under the unrecorded conditions of this experiment.

Hess and Lewis,[37] 1933: This was an outpatient, winter, curative study of irradiated milk, "yeast milk," viosterol in oil and cod liver oil. A large proportion of the infants were Negroes, mostly Puerto Ricans. The babies were from 2 to 17 months of age. Irradiated milk with from 135 to 160 units of vitamin D to the quart was fed at levels of 115 and 75 units (24 and 16 ounces of milk). The criterion was roentgenograms. The 115 unit group included four infants of 17, 13, 9 and 4 months of age. The three older infants had severe rickets, and after four weeks of feeding with irradiated milk the healing was recorded as 3 plus and 2 plus. The youngest infant had slight rickets and the healing was recorded as 1 plus. The 75 unit group included six infants of 9, 9, 6, 4, 3 and 2½ months of age. The 6 months old infants had marked rickets and the healing was questionable. One 9 months old infant had moderate rickets and the healing was 1½ plus. The remaining infants had slight rickets and the healing after four weeks was 2, 1½, 1 and 1 plus.

In the study of "yeast milk" two groups of five infants each were given 24 ounces daily of milk containing 325 and 215 units of vitamin D to the quart respectively. The two groups received 245 and 160 units daily respectively. The five infants of the 245 unit group were 8, 6, 5, 6 and 4 months of age. At the start the rickets was moderate in three and slight to moderate in two infants. After four weeks the healing was 2½, 2, 1½, 1 and 1 plus. The infants of the 160 unit group were 11, 5, 6, 5 and 6 months of age. At the start the rickets was moderate in two, slight to moderate in one and slight in two. After four weeks the healing was 2, 2, 1, 1½ plus and 0. Healing was present in six weeks in the baby who showed no healing at four weeks.

In the study of viosterol preparations eight babies from 2 to 12 months of age were given 865 units daily (as viosterol in oil). The amount of milk is not stated. On the assumption that the amount of milk was the same as for most of the associated observations, viosterol showed a distinct inferiority as compared with irradiated milk and "yeast milk." The 865 units as viosterol permitted one-third as much healing as did 115 units as irradiated milk and one-half as much as 160 units as "yeast milk."

The results with cod liver oil were discarded by the authors because they were irregular and unsatisfactory. The authors concluded that irradiated milk has about twice the effectiveness of "yeast milk" and fifteen times the effectiveness of viosterol on the basis of equal unitage. Their conclusions otherwise, as based on the data presented, cannot be determined for the reason that the discussion of the vitamin D situation is based on all the previous experience of these authors.

From the data presented it is obvious that irradiated milk with from 135 to 160 units to the quart produces improvement in rickets. A valid comparison between the 75 unit irradiated milk group and the other groups is difficult for the reason that the milk intake of the 75 unit group was reduced in proportion to the vitamin D reduction. When the healing results are averaged, only a slight advantage is evident in favor of the larger over the smaller unitage of "yeast milk," the difference between 1.3 and 1.6 plus. When the 115 unit irradiated milk group is compared with the 160 unit "yeast milk" group, there appears to be two-thirds as much healing in the "yeast milk" group with four-thirds the amount of vitamin D. Thus it may be considered that for these two groups of babies irradiated milk seems approximately twice as effective as "yeast milk." It may be concluded also that 24 ounces of "yeast milk" containing either 215 or 325 units of vitamin D to the quart produces improvement in rachitic infants, the latter being somewhat more effective.

In this and other publications by these authors, comparisons are made between the various antirachitic agents as regards relative effectiveness for man. Among the agents compared is cod liver oil. These comparisons, especially of irradiated milk with cod liver oil, have been quoted extensively. For comparison it would seem desirable that the values to be compared be determined with some degree of accuracy. So far as the reviewer can ascertain, these authors have determined neither the minimum protective nor the minimum curative dose of cod liver oil, but a value has been assigned to this substance and the assumed value has been used for comparison. If actual data available from other sources indicate conclusions at variance with those of these authors as regards cod liver oil, it seems appropriate to give preference to the conclusions based on data.

Wyman,[32] 1933: This was a metabolic study of a 16½ months old rachitic infant who was given "yeast milk" containing 430 units of vitamin D to the quart in amounts of from 940 to 1,180 cc. (430 to 540 units) daily. The control period was in April and the experimental period from April 23 to June 9. The serum calcium and phosphorus at the end of the control period were 9.7 and 2.4 mg. per hundred cubic centimeters respectively; after twelve days of the experimental period the values became 11.8 and 5.5 mg. respectively. The retentions of calcium and phosphorus in the control period were 0.078 and 0.020 Gm. daily, and during the experimental period 0.855 and 0.592 Gm. These results indicate that "yeast milk" with 430 units of vitamin D to the quart allows ample for good healing of rickets when the infant receives a quart or more of milk. The increase in serum calcium and phosphorus is very satisfactory for the time allowed. The retention indicates rapid deposition of calcium.

Kramer and Gittleman,[38] 1933: This was an inpatient curative study comparing irradiated milk and milk from cows fed irradiated yeast. The criteria consisted of roentgenograms and determinations of the calcium and phosphorus of the serum. The study was carried into early summer. Most of the infants were Negroes; all were housed in such a manner as to minimize the effect of sunshine, and the results with control patients indicated a negligible effect from extraneous vitamin D

36. Barnes, D. J.: J. Michigan State M. Soc. **32**: 242 (April) 1933.
37. Hess, A. F., and Lewis, J. M.: An Appraisal of Antirachitics in Terms of Rat and Clinical Units, J. A. M. A. **101**: 181 (July 15) 1933.
38. Kramer, Benjamin, and Gittleman, I. F.: New England J. Med. **209**: 906 (Nov. 2) 1933.

factors. Thirteen infants from 3 to 22 months of age were chosen as subjects and were kept without antirachitic treatment for a period to preclude spontaneous healing. Three infants showed evidence of healing in the preliminary period. The remaining ten infants were used for the experiment. Each infant ingested 1 quart of milk daily. Two infants received "yeast milk" containing 150 units; three received "yeast milk" containing 110; three received irradiated milk at the 150 unit and two at the 110 unit level. At the levels fed, the authors observed no significant difference in effectiveness between "yeast milk" and irradiated milk.

This was a well controlled experiment. Whether significant or not, it is of interest to note the ratios of effectiveness as determined by the time required to produce the first signs of healing by roentgen rays. At each level the irradiated milk showed a slight superiority over the "yeast milk." For the 150 unit groups the ratio was 1 : 1.4 and for the 110 unit groups 1 : 1.45. At the same time the expected differences appear between 110 and 150 units of each group. The 110 unit irradiated milk produced approximately the same initial healing results as the 150 unit "yeast milk." The experiment was not continued to complete healing, though the healing was far advanced in those cases in which it was not complete. The blood calcium and phosphorus values were not yet normal in some of the infants at the close of the experiment. Failure to produce normal values after from one to one and one-half months of treatment indicates a relatively low degree of effectiveness.

Jeans and Stearns,[39] 1934: This was an inpatient, metabolic, preventive study. The study group included seven infants from 3 weeks to 15 months of age. Irradiated evaporated milk, evaporated milk with cod liver oil concentrate (Vitex or Zucker concentrate) and evaporated milk together with cod liver oil given separately were the three diets used for the observations. Food intakes were known accurately. Each of the three experimental diets was given to a group of infants of the same age and milk intake; in the course of the observations, each infant received each diet in turn. The criteria used were calcium retention, rates of growth, roentgenograms and serum calcium and phosphorus. The study included forty metabolic periods. The youngest infants received only 60 units of vitamin D daily at the beginning of the study; by 16 weeks of age all the infants were receiving 135 units daily. During the study, no infant developed rickets. The calcium retentions on the three diets showed the same range. No source of vitamin D proved superior in any way to either of the other two as regards retentions. The average calcium retention of the group was lower by 10 mg. per kilogram than the retention observed with infants given the same milk intakes per kilogram but 340 units of vitamin D as cod liver oil. The growth and development of the study group was definitely slower than in control groups given 340 units of vitamin D. The authors conclude that the three sources of vitamin D studied are apparently equivalent, unit for unit. It is implied also that 135 units of vitamin D to the quart of reconstituted evaporated milk does not allow sufficient intake of vitamin D to permit the best development of infants, even though it is indicated that this amount of vitamin D will prevent rickets.

Wilson,[40] 1934: This was a clinical outpatient study of cod liver oil concentrate (Vitex) milk containing 400 units to the quart. The study group consisted of thirty-three infants from 6 to 13 weeks of age at the start, including two pairs of twins, three prematurely born and one infant probably born prematurely. With one exception, none had had antirachitic treatment before the test period. The feeding was undiluted milk with from 8 to 10 per cent added sugar. The milk ingestion varied from 17 to 32 ounces daily (215 to 400 units). The criteria consisted of monthly roentgenograms and body weights and lengths. The progress and general development of the infants were generally normal and satisfactory. All had attained at least the average length and weight for their ages before the end of the study. Musculature and appearance were excellent. Some of the infants developed what is termed mild or doubtful rickets; for the purpose of this review and for reasons stated in the preceding discussion, these cases are classed as normal. Two infants developed rickets of moderate and significant severity. One of these two infants was "probably premature." Prematurity might be a partial explanation of the result even though the regimen prevented rickets in three other babies prematurely born and in two pairs of twins. The other rachitic infant developed rickets in a home with such poor conditions that removal from the home became desirable; it recovered from rickets very promptly after removal while receiving vitamin D milk as the only antirachitic agent. The rapid recovery suggests strongly that the previous intake of vitamin D milk may have been different from that which was assumed. Accepting these two cases of rickets at their face value, the study shows that cod liver oil concentrate milk containing 400 units of vitamin D to the quart prevented rickets in twenty-eight of twenty-nine full term infants and in three of four infants prematurely born. The rapid recovery of the one full term infant from rickets after it was brought under better control favors holding in abeyance the full acceptance of this case.

Drake, Tisdall and Brown,[41] 1934: This was an outpatient preventive study carried on from October to May. It concerned the effects of cod liver oil, viosterol and irradiated milk. Roentgenograms were the criterion. Growth in weight was reported as normal, and above or below normal. A group of 137 infants received cod liver oil; one infant receiving two teaspoonfuls (700 units) and two receiving three teaspoonfuls (1,050 units) developed moderate or marked rickets; none receiving one teaspoonful (350 units) developed this degree of rickets. A group of 186 infants received from 270 to 2,160 units of vitamin D as viosterol in oil. Of these no infant developed moderate or marked rickets at any level fed. A group of 141 infants received irradiated milk. None developed moderate or marked rickets. Thirty-eight of these infants under 4 months of age at the beginning of the experiment received 20 ounces of milk (95 units). The absence of moderate rickets in this group is contrasted with observations on thirty-one untreated infants, four of whom developed moderate or marked rickets. The authors do not draw any comparative conclusions concerning the relative values of the various sources of vitamin D, nor do such comparisons seem possible because the three types employed were not given in similar unitage. No distinction is made between babies breast fed and those artificially fed except in the irradiated milk group. Some of the infants received egg yolk. This study is illustrative of the weaknesses

39. Jeans, P. C., and Stearns, Genevieve: Proc. Soc. Exper. Biol. & Med. **31**: 1159 (June) 1934.
40. Wilson, W. R.: Prevention of Rickets by Milk Fortified with Vitamin D from Cod Liver Oil, J. A. M. A. **102**: 1824 (June 2) 1934.
41. Drake, T. G. H.; Tisdall, F. F., and Brown, A. G.: Canad. M. A. J. **31**: 368 (Oct.) 1934.

inherent in outpatient studies in general. One might infer that 95 units as irradiated milk is superior to 1,050 units as cod liver oil, though such an inference is invalidated by the results with 350 units as cod liver oil. A reasonable conclusion is that irradiated milk was apparently effective in preventing rickets, as was also cod liver oil in the amount of one teaspoonful daily (350 units) and viosterol in oil at the level of 270 units daily.

Barnes,[42] 1934: This was an outpatient preventive and curative study conducted from November to April. The study groups included twenty-two white and ten Negro infants without rickets and four white and two Negro infants with mild rickets. The infants varied in age from 1½ to 12 months, the average age at the start being about 6 months. No infant had had any antirachitic therapy except casual exposure to the sun during the preceding summer. During the experiment each infant, regardless of the total milk intake, received 135 units of vitamin D as cod liver oil concentrate (Vitex) in milk. Biweekly weights and roentgenograms were the criteria. A group of twenty-five infants, twelve white and thirteen Negroes, served as controls; these had had no antirachitic therapy through the winter and had a roentgenologic examination in April. The average age of the controls in April was 6.2 months. Fourteen (56 per cent) of the control group were rachitic as determined by the x-rays. Of the experimental groups the thirty-two normal infants were completely protected; the weight gains were satisfactory. The six infants who showed slight signs of rickets at the beginning of the experiment showed progressive improvement. In no case did the patient grow worse during the study. Healing occurred in from eight to sixteen weeks. On the basis of these observations it may be concluded that cod liver oil concentrate milk will prevent and cure rickets when the amounts of milk are adequate and the vitamin D intake is maintained at a constant level of 135 units daily. The slow healing of rickets suggests that this level approaches the minimal effective amount.

Wyman, Eley, Bunker and Harris,[43] 1935: This was an inpatient, curative study conducted from January to March, comparing irradiated milk and milk from cows fed irradiated yeast. The irradiated milk averaged barely 135 units and the "yeast milk" varied from 160 to 175 units to the quart. Roentgenograms and determinations of serum calcium and phosphorus were made at weekly intervals. The six infants observed were kept without vitamin D for a preliminary period to preclude spontaneous healing. Three infants, 6, 7 and 26 months of age, were given irradiated milk and three infants, 8, 9 and 22 months of age, were given "yeast milk," both milks in daily amounts of from 26 to 32 ounces. Each infant showed some healing within four weeks; they were not studied to complete healing. From examination of the roentgenograms and the rate of increase of the calcium × phosphorus product the authors conclude that the two milks are equivalent, unit for unit.

In this experiment the "yeast milk" contained from 20 to 30 per cent more vitamin D to the quart than did the irradiated milk, and the babies of the "yeast milk" group received approximately 20 per cent more vitamin D than did the babies of the irradiated milk group. Despite this disparity in the amounts of vitamin D the blood phosphorus curves, when plotted against time, showed a much steeper rise for the irradiated milk group. The comparison obviously indicates a superiority for irradiated milk. The superiority is something more than 20 per cent.

Gerstenberger, Horesh, Van Horn, Krauss and Bethke,[44] 1935: This was an inpatient, curative study of irradiated milk and milk from cows fed irradiated yeast. The criteria used were roentgenograms, the time required for complete healing, and the serum calcium, inorganic phosphorus and phosphatase. It was originally intended to have the two milks at the same unitage level of vitamin D; viz., 148 units to the quart. The preliminary assays indicated an equal unitage, but later check assays showed a content of 216 units to the quart for the irradiated milk and 148 units for the "yeast milk," a ratio of approximately 1.5:1. In the clinical trial thirteen rachitic infants (twelve Negro, one white) were kept for from two to four weeks without antirachitic treatment to preclude spontaneous healing. Irradiated and "yeast" milks were then fed at levels of 720 and 480 cc., the total milk intake being kept approximately the same by the addition of skimmed milk to the diet. Both levels of feeding produced healing of rickets, the lower level much more slowly than the higher. From a comparison, in infants of the same age and severity of rickets, of the times required for healing as judged by roentgenograms and the production of normal blood values, the authors estimate that the irradiated milk was one and one-half times as potent as the "yeast milk." This ratio is the same as that found by assay of the milks. The authors conclude that the two types of milk seem of equal efficacy, unit for unit, for healing rickets in infants. They express the opinion that, if some difference does exist, it is the irradiated milk that is slightly superior. The belief is stated that 75 units of vitamin D daily is very close to the minimal amount required for ultimate healing of active rickets. In this experiment, vitamin D in the amount of 110 units daily was sufficient to heal rickets in from nine to twelve weeks and to produce normal serum calcium and phosphorus values in from seven to nine weeks.

This study is a good example of a well controlled curative experiment. The authors present a critical discussion of criteria for this type of study and offer an explanation of the lack of agreement between the results presented and some of those previously published by others. Some data are given as the basis of a discussion of the minimum preventive and curative dose of cod liver oil. In comparing irradiated milk to cod liver oil, the authors state that their data would probably establish the ratio at 1:1.

The data presented in this publication permit interpretations in addition to those presented. When the time for bone healing is used as the criterion, no difference is established between the 108 unit irradiated milk and the 108 unit "yeast milk" groups or between the 108 unit irradiated milk and the 162 unit irradiated milk groups. When the time required to establish normal blood values is used as the criterion, definite differences are observed. Irradiated milk supplying 108 units seems superior to "yeast milk" supplying 108 units, and the irradiated milk supplying 162 units seems superior to irradiated milk supplying 108 units. When the time required to establish normal blood calcium and phosphorus values is used as the criterion, the ratio of effectiveness of irradiated milk as compared to "yeast milk" is 1:1.3; when phosphatase values are used the ratio is 1:1.4. From the point of view here presented,

42. Barnes, D. J.: Rickets, Am. J. Dis. Child. **48**: 1258 (Dec.) 1934.
43. Wyman, E. T.; Eley, R. C.; Bunker, J. W. M., and Harris, R. S.: New England J. Med. **212**: 257 (Feb. 7) 1935.
44. Gerstenberger, H. J.; Horesh, A. J.; Van Horn, A. L.; Krauss, W. E., and Bethke, R. M.: Antirachitic Cow's Milk, J. A. M. A. **104**: 816 (March 9) 1935.

the author's opinion as to the possible superiority of irradiated milk seems confirmed.

Lewis,[45] 1935: Observations are reported which compare irradiated ergosterol in corn oil with irradiated ergosterol in milk. The preparation used was "crystalline vitamin D (calciferol)." This was an outpatient curative study. The study group included thirty-six infants, divided into four groups. Nine infants received 243 units of this vitamin D in oil, ten received 2,430 units in oil, nine received 243 units in milk and eight received 121 units in milk. Each baby received 24 ounces of milk daily. The criterion was the amount of healing at four, six and eight weeks as shown by roentgenograms. The author concluded that better results were obtained with 121 units in milk than with 243 units in oil and that 243 units in milk gave better results than 2,430 units in oil. He believes that the results obtained offer an explanation for the greater effectiveness of antirachitic milks as compared with viosterol in oil. Irradiated ergosterol in the amount of 121 units in milk was below the minimum curative level, as was also 243 units in oil. However, 243 units in milk was an adequate curative dose; this amount approximates three times the amount the author believes effective when administered as irradiated milk.

Tisdall, Drake and Brown,[46] 1935: Two infants with acute rickets were treated with irradiated cholesterol in corn oil. This substance in the amount of 750 units daily produced rapid healing. Good deposition of new bone was observed in two weeks and complete cure by seven weeks.

Rapoport, Stokes and Whipple,[47] 1935: This was an inpatient preventive and curative study of irradiated evaporated milk containing 125 units of vitamin D to the 14½ ounce can. The study group consisted of twenty-three infants under 5 months of age at the beginning of the experiment. The study was conducted from January 2 to May 15. Five infants had mild rickets at the beginning of the study. All the infants were fed nonirradiated evaporated milk for about one month. They were then divided into two groups according to the presence or absence of rickets by roentgenographic examination. The preventive group comprised nine infants and the curative group thirteen. One infant is considered separately because he failed to develop rickets after twelve weeks of feeding with nonirradiated milk that contained 30 units of vitamin D to the 14½ ounce can.

The nine infants of the preventive group received amounts of milk which permitted the ingestion of from 88 to 127 units of vitamin D daily. One developed mild rickets after eight weeks of irradiated milk feeding; the rickets healed in another four weeks. One infant developed moderate rickets, which later began to heal under the same regimen. The latter infant was one of twins and weighed 6 pounds 13 ounces (3,091 Gm.) at 5 weeks of age when the experiment started. He was then given nonirradiated milk for eight weeks without the development of rickets. With the irradiated milk he received 92 units of vitamin D daily. For the entire group the duration of irradiated milk feeding varied from four and one-half to thirteen weeks.

Of the thirteen infants in the curative experiment, two had complete healing, three slight healing, two an advance of the rachitic process followed by slight healing, four no healing and two an advance of the process without healing.

The authors conclude that irradiated evaporated milk containing 125 units of vitamin D to the 14½ ounce can appeared to be adequate for the prevention of rickets in infants. They conclude also that the same milk appears to be unreliable for the cure of rickets in infants.

The results with two of the babies in the preventive group raise a question as to the adequacy of the protection provided by the product used. At least it is indicated that the amount of vitamin D given approaches the lowest level of a preventive dose. The curative results are in distinct contrast to those of other studies of this review. The fact that rickets increased in severity in 30 per cent of the infants of the curative study indicates a low preventive effectiveness.

Jeans and Stearns,[48] 1935: This was an inpatient, winter, metabolic study. The study group consisted of five white infants. When the experiment was started, one infant was 11 weeks, one was 6 weeks and the remaining three were from 10 to 20 days old. They were given evaporated milk containing cod liver oil concentrate (Vitex) with 400 units to the reconstituted quart. The daily intake of vitamin D varied from 245 to 400 units. The rate of growth of each infant both in weight and in length was above the Kornfeld averages and equal to the rate of growth of infants kept under similar conditions but given 340 units of vitamin D as cod liver oil. The infants were precocious in dentition and muscular achievement. The roentgenograms showed no rickets. The per kilogram retentions of calcium for thirty-four metabolism periods were reported. The retention for each intake was within the range and averaged approximately the same as the retention of a larger group of infants (200 periods of study) given 340 units of vitamin D daily as cod liver oil, and about 10 mg. per kilogram higher than the retentions observed in a similar group of infants given 135 unit milk. From this study it was concluded that evaporated milk containing cod liver oil concentrate sufficient to allow 400 units of vitamin D to the reconstituted quart prevents the development of rickets and permits high retentions of calcium and excellent growth and development of infants.

Strong, Naef and Harper,[49] 1935: This was an outpatient, preventive study carried on in New Orleans from December 1933 to November 1934. The study group consisted of twenty-two infants who were fed irradiated evaporated milk in such quantities that from 70 to 160 units of vitamin D was ingested daily, the amount being proportionate to the age of the infant. The infants were mostly in the first six months of life. The results were determined by roentgenograms, a single examination being made for each baby after a period of observation of from four to seven months. Roentgenograms were not made of two of the twenty-two infants. Of the remaining twenty infants the roentgenograms were made as follows: one in April, three in May, twelve in June, one in July, two in August and one in October. One baby examined in August was reexamined in November. Slight evidence of rickets was present in two infants, one examined in April and one in June. A control group given from 10 to 15 drops of viosterol daily (from 865 to 1,300 units) had no evidence of rickets. The authors con-

45. Lewis, J. M.: J. Pediat. **6**: 362 (March) 1935.
46. Tisdall, F. F.; Drake, T. G. H., and Brown, A. G.: Canad. M. A. J. **32**: 490 (May) 1935.
47. Rapoport, Milton; Stokes, J., Jr., and Whipple, Dorothy V.: J. Pediat. **6**: 799 (June) 1935.
48. Jeans, P. C., and Stearns, Genevieve: Proc. Soc. Exper. Biol. & Med. **32**: 1464 (June) 1935.
49. Strong, R. A.; Naef, E. F., and Harper, I. M.: J. Pediat. **7**: 21 (July) 1935.

clude that irradiated evaporated milk should be supplemented with additional vitamin D. Presumably they held the slight amount of rickets found as of significance. A preventive study in the summer can be of no significance if rickets is not found. The finding of definite rickets would be important. The question arises as to how definite the rickets was in these two cases.

Compere, Porter and Roberts,[50] 1935: This was an inpatient curative study of irradiated yeast in comparison with cod liver oil. It was conducted from January 1 to April 1. The study group consisted of twenty-one infants from 5 months to 2½ years of age. The infants were divided into five groups. Group 1 served as the control and group 2 received 2,061 units of vitamin D as cod liver oil. The remaining groups received irradiated yeast in amounts which supplied 2,252, 6,755 and 13,511 units of vitamin D. Roentgenograms were taken and determinations of calcium and phosphorus in the serum were made. The authors conclude that from 1.1 to 3.3 times as much of the vitamin D of irradiated yeast as of the vitamin D of cod liver oil is needed to produce the same curative results as determined by roentgenograms.

The reviewer is unable to evaluate this study on any basis employed in this review. More than half of the babies apparently had rickets of the mild and doubtful variety, which has been excluded from consideration in this review. Even by the exacting criteria employed, one baby had "little evidence of rickets." Further difficulties in evaluation are encountered in that the dosages employed are far above what are generally considered to be minimum effective levels.

Peterman and Epstein,[51] 1935: This was an orphanage study of evaporated milk containing 400 units of vitamin D as cod liver oil concentrate (Barthen) to the 14½ ounce can (13 fluidounces). The observations began in January 1934 and continued to February 1935. As infants were discharged from the study group, replacements were made. The babies ranged in age from 2½ to 18 months at the beginning of the study. The criteria were roentgenograms and calcium and phosphorus values of the serum. The lowest average daily intake of vitamin D for any baby for any tabulated period was 308 units and the highest was 620 units. The authors found that no infant had any clinical, chemical or roentgenographic sign of rickets during the period of the study, and they concluded that the milk was amply protective.

From the tabulated data it may be calculated that the twelve babies with which the experiment started in January had at the beginning an average of 9.10 mg. of calcium and 6.08 mg. of phosphorus per hundred cubic centimeters of serum. In April, approximately three months after the experiment started, the average values for the same babies were calcium 10.12 mg. and phosphorus 3.54 mg. per hundred cubic centimeters. In February 1935 the average values for all the babies remaining in the group (ten infants) were calcium 10.35 mg. and phosphorus 4.74 mg. per hundred cubic centimeters. Such results can scarcely be considered satisfactory. The April values are such as might be expected with little or no vitamin D and are distinctly at variance with those of other studies of this review in which an equivalent or smaller quantity of vitamin D was used as cod liver oil or cod liver oil concentrate.

Drake, Tisdall and Brown,[52] 1936: This was an outpatient winter study of 103 infants from 1 to 6 months of age who received irradiated evaporated milk. The milk contained 9.8 units of vitamin D to the ounce. The amount of milk received by the babies varied from 6 to 20 ounces. Few babies received more than 16 ounces. Moderate or marked rickets was not observed; 17 per cent developed mild rickets. Of fifty-two babies receiving evaporated milk without vitamin D, 10 per cent developed moderate or marked rickets and 29 per cent developed mild rickets. Of fifty-two babies receiving pasteurized fresh milk without vitamin D, 23 per cent developed moderate or marked rickets and 25 per cent developed mild rickets. Concerning the slight and mild rickets, the authors state: "In the interpretation of the x-ray from the clinical standpoint it must be kept in mind that the 'extremely slight rickets' are so slight that most physicians would classify these x-ray plates as normal. Those grouped as 'mild rickets' also do not show changes which would cause any great concern from the clinical standpoint." For the purpose of this review the cases of mild rickets are excluded from consideration. The authors state that the babies gained weight faster than the usual rate. Growth data are not given.

Rapoport and Stokes,[53] 1936: This was an inpatient winter study of ten infants receiving irradiated evaporated milk and of nine infants receiving irradiated fresh milk. For eighteen of the infants the experiment was preventive and for one curative. At the beginning of the experiment the infants were from 2 weeks to 5½ months of age, with an average age of 2 months. The evaporated milk contained 125 units of vitamin D to the 14½ ounce can and the fresh milk 140 units to the quart. For both groups of infants the vitamin D intake varied from 100 to 145 units daily. The observations were made over a period of four and one-half months. No infant developed rickets. The one infant who had mild rickets at the beginning of the study had slow healing; healing was first noted at thirteen weeks and was complete at eighteen weeks. The authors call attention to the lack of agreement between the clinical and the x-ray signs of rickets. It is stated that excellent growth and development of the infants were observed.

The results of this experiment indicate that irradiated fresh milk and irradiated evaporated milk are of equal value. The slow healing of rickets indicates a close approach to a minimum effective level of vitamin D. As nearly as can be determined from the data given, the rates of growth correspond closely to Kornfeld's averages with the exception of two babies who made greater growth progress.

Lewis,[54] 1936: This report concerns the effect of crystalline vitamin D administered in milk, in oil and in propylene glycol, in an outpatient preventive study conducted from December to the end of April. The 255 infants were distributed into eight groups. Between 50 and 60 per cent of the babies of each group were Negroes. Nearly 50 per cent of the babies were either partially or wholly breast fed, but none of these were included in the groups receiving the vitamin D in milk.

Rickets developed in three of fifty-eight babies (5.1 per cent) receiving 145 units of vitamin D in 28 ounces of milk, in six of forty-one infants (14.6 per cent) receiving 145 units of vitamin D in oil, and in six of forty-four infants (13.6 per cent) receiving the same

50. Compere, E. L.; Porter, Thelma E., and Roberts, Lydia J.: A Clinical Comparison of the Antirachitic Value of Irradiated Yeast and of Cod Liver Oil, Am. J. Dis. Child. **50**: 55 (July) 1935.

51. Peterman, M. G., and Epstein, Ely: Prevention of Rickets with a Cod Liver Oil Concentrate in Milk, Am. J. Dis. Child. **50**: 1152 (Nov.) 1935.

52. Drake, T. G. H.; Tisdall, F. F., and Brown, A. G.: J. Pediat. **8**: 161 (Feb.) 1936.

53. Rapoport, Milton, and Stokes, J., Jr.: J. Pediat. **8**: 154 (Feb.) 1936.

54. Lewis, J. M.: J. Pediat. **8**: 308 (March) 1936.

amount of vitamin D in propylene glycol. At the level of 290 units of vitamin D daily, rickets developed in one of fifty-one infants (1.9 per cent), in five of fifty-two infants (9.6 per cent) and in five of forty-five infants (11.1 per cent) who received the vitamin D respectively in milk, in oil and in propylene glycol. Of forty-two babies who received 1,450 units in oil, one (2.4 per cent) developed rickets. Of a control group of twenty-two babies receiving no vitamin D, eight (36.3 per cent) developed rickets. In a baby with rickets 290 units of crystalline vitamin D in 28 ounces of milk was effective, whereas previously in the same infant 290 units in a teaspoonful of milk produced no healing.

The author concluded that "crystalline vitamin D" is much more effective when dispersed in milk than when administered in a more concentrated state in oil or propylene glycol. He considers also that 1,450 units in oil is a satisfactory protective dose. Interpretation of this study is not aided by the fact that in a preventive experiment rickets developed at all levels of vitamin D administration and that an intake of vitamin D which permits rickets is considered satisfactory.

SUMMARY OF CLINICAL STUDIES

Cod Liver Oil.—DeSanctis and Craig found that cod liver oil at an estimated level of from 380 to 460 units prevented physical signs of rickets in 97 per cent of the babies studied. Barnes, Brady and James observed cure or prevention of rickets in all but two of sixty-four babies receiving 840 units of vitamin D as cod liver oil in an outpatient study; the mother of one of the rachitic infants was noncooperative. Also, in an outpatient study Drake, Tisdall and Brown obtained complete protection against moderate rickets with one teaspoonful of cod liver oil (350 units) daily, though complete protection was not attained with two and three times this amount. Julius Hess observed no rickets when one teaspoonful of cod liver oil (350 units) was fed daily. Jeans and Stearns [23] and Nelson [23] observed ample retentions of calcium and phosphorus and no rickets when one teaspoonful of cod liver oil was given. Jeans and Stearns found poorer retentions of calcium and phosphorus, though no rickets, with from 60 to 135 units of vitamin D as cod liver oil. The evidence presented can be interpreted to indicate that one standard teaspoonful of cod liver oil (350 units) is ample and that 135 units or less may prevent rickets, but it permits retentions of calcium and phosphorus definitely lower than the retentions obtained with a larger intake of vitamin D.

Irradiated Ergosterol.—The lowest level of irradiated ergosterol found successful in preventing rickets is 270 units, as reported by Drake, Tisdall and Brown, and 286 units as reported by Julius Hess. This is in contrast to the failure of Barnes to prevent rickets with 750 units and the failure of Alfred Hess to prevent rickets with 5,700 units: however, in the same experiment Hess observed rickets prevention with 2,860 units. Later, Alfred Hess obtained healing with 865 units. Lewis found 243 units as crystalline vitamin D in oil below the minimum curative level and later found 290 units in either propylene glycol or in oil to be below the minimum protective level. The data cited are too conflicting to allow satisfactory conclusions. If 270 units (Drake, Tisdall and Brown) daily is an adequate preventive dose, it may be considered that the minimum preventive dose has not yet been determined.

Cod Liver Oil Concentrate in Milk.—Using milk containing vitamin D as cod liver oil concentrate in the amount of 400 units to the quart, Barnes found that from 300 to 400 units brought about prompt recovery from rickets. Later he found that 135 units daily in milk gave complete protection against rickets and produced slow but complete healing of rickets. Wilson obtained protection against moderate rickets with 400 unit milk in all full term infants studied except one not under good control. The experiments cited are with fresh milk. It may be concluded that fresh milk containing 400 units of cod liver oil concentrate to the quart when fed in customary amounts to full term infants will prevent rickets.

Evaporated milk with cod liver oil concentrate has produced results similar to those observed with fresh milk, with the exception of Peterman and Epstein's study. Jeans and Stearns observed not only prevention of rickets but high retentions of calcium and phosphorus when evaporated milk was fed with 400 units to the reconstituted quart. The retentions were of the same order as those observed when one teaspoonful of cod liver oil was given and considerably better than the retentions obtained with 135 unit milk. The retentions with 135 unit milk were believed to be suboptimal.

The results with fresh milk and with evaporated milk are sufficiently similar to permit their consideration as of one group. Though 135 unit milk prevents rickets, it may permit a suboptimal intake of vitamin D as judged by calcium retention. Milk containing 400 units to the quart seems entirely adequate.

Irradiated Milk.—Four preventive studies of irradiated fresh milk have been reported. In all four reports good results are claimed, but failure in complete prevention is recorded for two of the four studies.

The results with irradiated evaporated milk agree with those of irradiated fresh milk. In the study of Rapoport, Stokes and Whipple, rickets appeared in one or two of the nine subjects observed, and in the curative study rickets increased in severity in several cases. In the 1936 report of Rapoport and Stokes, better results are recorded. Drake, Tisdall and Brown report the prevention of moderate rickets. Two of twenty-two infants of Strong's study developed rickets. Jeans and Stearns report what are considered to be suboptimal retention of calcium with irradiated evaporated milk.

No reason has become evident for considering that irradiated fresh milk and irradiated evaporated milk have different antirachitic values. In the recent study of Rapoport and Stokes the two varieties were compared under the same conditions and appeared to be of similar value. In curative experiments with irradiated milk additional evidence is offered that vitamin D is present in amounts very close to the minimum effective level. The time required for healing is long and in some instances no healing occurred.

It may be concluded that irradiated milk will prevent rickets in most full term babies but that the amount of vitamin D present approaches closely the minimum preventive level and permits what is believed to be suboptimal retention of calcium.

"Yeast Milk."—Only one preventive study with "yeast milk" has been found (Hess, 1931). In this study rickets developed at a level of 160 units daily and was prevented at a level of 320 units. In this study two of the three babies observed on a curative basis had an increase in their rickets at the 160 unit level. In contrast to this curative observation, Kramer obtained healing at a level of 150 units and Gerstenberger at a level of 74 units. Wyman's studies show excellent antirachitic values for "yeast milk" with 430 units to the quart when a quart or more of milk is ingested.

Irradiated Ergosterol Milk.—Using milk from cows fed irradiated ergosterol preparations, Hess observed prevention of rickets with 160 and with 320 units daily. Gerstenberger observed slow and uncertain curative results with milk containing approximately 135 units to the quart. When crystalline vitamin D was added directly to milk, Lewis found 121 units daily to be below the minimum curative level and 243 units an adequate curative dose; later he found 290 units in milk to be a more or less adequate protective level. If 121 units daily is below the minimum curative level, an inferiority to irradiated milk and cod liver oil concentrate milk is indicated.

Animal Source Group.—Only three reports have been found in which two sources of vitamin D of animal origin are compared by use concomitantly in the same experiment. One of these (Daniels) may be disregarded because of unknown potency of the materials used. The study of Drake, Tisdall and Brown offers no basis for comparison. Cod liver oil at the lowest level fed, viz., one teaspoonful, protected against rickets. Irradiated milk fed at levels permitting 95 or more units daily gave protection. Jeans and Stearns compared cod liver oil, cod liver oil concentrate milk and irradiated milk with the conclusion that these are of equal value, unit for unit when the criterion is calcium retention.

Indirect comparisons also indicate equal values. Barnes prevented rickets with 135 units as cod liver oil concentrate in milk, and in several studies rickets was almost completely prevented with 135 unit irradiated milk.

Such evidence as is available may be interpreted to show that cod liver oil, cod liver oil concentrate milk and irradiated milk are of equal potency for the human being, unit for unit.

Vegetable Source Group.—Hess is the only one who has compared two sources of vitamin D of vegetable origin in the same experiment. He found 160 units as irradiated ergosterol milk to be protective whereas 160 units as "yeast milk" was not. He also found irradiated ergosterol in oil inferior to "yeast milk," the requirement for viosterol being ten times that for "yeast milk." Lewis reported the requirement of crystalline vitamin D in oil to be ten times that of crystalline vitamin D added to milk; the data of a later experiment indicate that the requirement for the crystalline vitamin D in oil is less than five times that for the crystalline vitamin D in milk; the minimum protective dose was not determined.

The comparisons cited between viosterol in oil and the vitamin D milks do not receive full support from studies of viosterol made by others. For example, the protection against rickets obtained by Drake, Tisdall and Brown with 270 units and by Julius Hess with 286 units as viosterol in oil is in striking contrast to the results reported by Alfred Hess and Lewis.

On the basis of Alfred Hess's report, an advantage might be interpreted in favor of irradiated ergosterol milk over "yeast milk." However, Kramer obtained curative results with 150 units as "yeast milk." The evidence available does not indicate any essential difference in relative human value between yeast milk and irradiated ergosterol milk.

Animal versus Vegetable Sources.—The reports of Barnes and DeSanctis indicate a superiority of cod liver oil over viosterol. The reports of Alfred Hess, of Kramer and of Gerstenberger and his associates may be interpreted to indicate that irradiated milk is from 1.3 to 2 times the value of "yeast milk." The report of Wyman indicates that irradiated milk is more than 20 per cent superior to "yeast milk" on a unit for unit basis.

On the basis that, unit for unit, yeast milk and irradiated ergosterol milk are of the same value, that irradiated milk and cod liver oil concentrate milk are of the same value, and that irradiated milk is superior to yeast milk, a group relationship has been established. Even granting these premises, the exact relationship between the two groups is not accurately determined. Whatever the difference, it seems to be small. On the basis of the evidence reviewed and its evaluation, the difference probably is not more than 1.5: 1. This ratio of effectiveness is based entirely on curative experiments. Because of the possible inherent weaknesses already discussed for curative studies, corroboration by preventive experiments seems highly desirable.

Dispersion of Vitamin D in Milk.—The report of Lewis that crystalline vitamin D is of greater value in milk than in oil raises a new question for consideration. If the enhanced value is due to dispersion and consequent increased availability for utilization, all the vitamin D milks have this factor in common. Observations recorded in this review indicate that cod liver oil and cod liver oil concentrate in milk are of equal value. In Lewis's experiment 243 units of vitamin D in milk was amply effective in a curative experiment, while the same amount in oil was quite ineffective. In a later report 290 units in milk was relatively effective in a preventive experiment, whereas the same amount in propylene glycol or in oil seemed less effective. These observations may be contrasted with the observation of Drake, Tisdall and Brown that 270 units in oil seemed amply protective. As regards animal experiments, Haman and Steenbock[7] were unable to observe any difference in the chicken between irradiated ergosterol in oil and irradiated ergosterol in milk.

SUMMARY

Exclusive of purely laboratory products there may be only two varieties of vitamin D, one of animal origin and one of vegetable origin. All animal sources may have a vitamin D of the same value. The same is true for all vegetable sources. Vitamin D of animal source appears to be more potent for the human being than the vitamin D of vegetable source. The degree of superiority is not entirely established, but on the basis of evidence available it may be in the ratio of 1.5: 1 when vitamin D milks are compared.

Animal source vitamin D milk with 135 rat units (U. S. P.) to the quart will prevent rickets, but this amount of vitamin D approaches closely the minimum effective level.

Prevention of rickets is not a criterion of adequacy of vitamin D intake. The amount of vitamin D that barely prevents rickets does not permit the best growth of infants, nor does it permit retentions of calcium and phosphorus as great as those considered desirable.

Animal source vitamin D in the amount present in one standard teaspoonful of average high grade cod liver oil or in milk containing 400 units to the quart is adequate for the infant from the standpoint of calcium retentions and growth. The minimal amount that is adequate is not known.

Vegetable source vitamin D has not been used in a manner which would determine directly the minimum rickets-preventive dose or the amount that permits good growth and retentions.

Children's Hospital.

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SATURDAY, JUNE 20, 1936

REDUCING THE MORTALITY OF ACUTE APPENDICITIS

Vital statistics of the United States place the mortality rate for acute appendicitis at 9 for each hundred thousand of population for the year 1920 and at 15 per hundred thousand for the year 1932. The Metropolitan Life Insurance statistics indicate that the mortality rate of acute appendicitis rose from 10.6 per hundred thousand for the period from 1911 to 1914 inclusive to 14.1 for the period from 1927 to 1930 inclusive. Recent reports from various clinics, however, show a definite lowering in the operative mortality of acute appendicitis. The contradiction is explainable on the assumption of a higher incidence of the disease and a greater number of recognized and reported cases.

The factors contributing to the mortality of acute appendicitis include the age and sex of the patient, administration of cathartics before the operation, and delayed operation, as well as the skill and the judgment of the surgeon. Age is the most important single factor. The high mortality in the young is due to the greater virulence of the infection, to a tendency to early perforation, and to a faster spread of the pathologic alterations. Diagnostic difficulties resulting in delayed operation, and the more frequent recourse to cathartics combine to give a mortality rate of 20 per cent in children under the age of 3 years. The high mortality rate past middle life is due principally to diagnostic errors caused by the frequency of atypical forms, owing to a less vigorous reaction on the part of the organism. According to Wood,[1] atypical clinical manifestations in a group of patients past middle life were seen in 50 per cent, a correct preoperative diagnosis was made in only 62 per cent and the mortality rate was 28 per cent. Both the incidence and the mortality rate of acute appendicitis are lower for women than for men, probably because of greater resistance of the pelvic peritoneum in the former.

1. Wood, C. B.: Am. J. Surg. **26**: 321 (Nov.) 1934.

There is a general agreement supported by statistical studies [2] that the administration of cathartics seriously affects the situation.

The merits of the early operation are too well established to require reiteration. The technic of operation is simple and the mortality rate when operation is performed during the first twenty-four hours varies from a fraction of 1 per cent to 0. Recently it was suggested that the inversion of the stump of the amputated appendix is not necessary. Omission of this step will further simplify the operation of appendectomy. Appreciation of the fact that one must not expect to find all the five cardinal symptoms (pain, localized tenderness, muscle spasm, rise in temperature and leukocytosis) in every case and adherence to the principle of early operation will undoubtedly reduce this mortality still further.

As soon as perforation has taken place, the problem of care in appendicitis becomes tremendously complicated as to both the estimation of the existing pathologic changes and the question of operative intervention. According to Aschoff,[3] pathologic complications are present, on an average, thirty-five hours after the onset of the attack. The mortality in this group rapidly rises, to reach in cases complicated by diffuse peritonitis the appalling figures ranging with various authors from 15 to 60 per cent. The cases in which perforation has taken place may be divided into four groups: (1) walled off perforation, (2) encapsulated abscess, (3) acute limited peritonitis and (4) acute spreading more or less diffuse peritonitis. The greatest divergence of opinion exists with regard to the treatment of the late cases complicated by a spreading peritonitis. In contradistinction to the surgeon who advocates the removal of the focus of infection as the most important step in the treatment of every form of perforative peritonitis, except of course when the patient is moribund, there are those who believe that with the progression of the disease the good to be derived from the operation diminishes and the damage inflicted rises. The adherents of this opinion believe that surgical intervention in cases past forty-eight hours is without value. They insist that the infection is more likely to become delimited on the Ochsner plan of management and that intervention at this stage is bound to interfere with the plastic defensive and immunobiologic properties of the peritoneum. They propose that patients admitted to the hospital "too late for the early operation and too early for the late operation" be treated conservatively, preferably with the Ochsner management.

The objections raised against the dictum of no operation after the forty-eight hours are that (1) the history frequently cannot be relied on to establish the

2. Bower, J. O.: Acute Appendicitis, J. A. M. A. **96**: 1461 (May 2) 1931. Leonard, E. D., and Derow, Sidney: Mortality Factors in Acute Appendicitis, New England J. Med. **214**: 52 (Jan. 9) 1936.

3. Aschoff, Ludwig: Pathologie und Klinik in Einzeldarstellungen, Berlin, Julius Springer, 1930.

number of hours, (2) the dictum forty-eight hours does not embrace all the factors comprising the picture, such as the extent of pathologic alterations, the virulence of the bacteria, the extent of intestinal paresis and the constitution of the patient, and (3) the adoption by the general practitioner of the dictum no operation after forty-eight hours is bound to do much harm. In favor of intervention it is argued that the continued discharge of infectious material and pathogenic organisms from the ruptured appendix and the intestine is bound to wear down the defensive power of the peritoneum and that therefore the removal of the focus of infection constitutes the most important step in the treatment of perforative peritonitis. Statistics are extant to prove the superiority of either method. Le Grand Guerry [4] reports a mortality rate of 1.4 per cent in a group of 135 cases of gangrenous ruptured appendicitis with diffuse peritonitis treated by the Ochsner method. On the other hand, Guy W. Horsley [5] reports a group of 502 consecutive cases of acute appendicitis in which an immediate operation was performed, with a mortality rate of 0.8 per cent. There can be no doubt that skill and judgment of the surgeon play an important part in the mortality rate of any operative procedure. The operative intervention in these complicated cases constitutes a major procedure. It is suggested that the high mortality rate of this group could be materially reduced if the chief surgeon, rather than the senior intern or the resident, would assume the responsibility for its management.

The controversy as to what to do with the patient who has a palpable swelling is less acute. Such a patient is admittedly not an emergency problem. The inflammatory swelling, in fact, represents a definite limitation of the pathologic condition. It is capable of a complete resolution without forming an abscess. An increase in the size of the swelling, pain, chills, rise in temperature and in leukocytes, and at times fluctuation establish the existence of an abscess. Watchful expectancy and intervention only when the abscess is not being absorbed is advocated by some. The more radical view is to operate regardless of the presence of a palpable swelling or the fact that it is regressing, the emphasis being placed on the removal of the appendix. An intermediate position is occupied by those who would operate in the presence of an inflammatory swelling or an early abscess, but who would wait for encapsulation in the case of a late abscess. They would further limit the procedure to an incision and drainage of the abscess without any attempt at the removal of the appendix. The objection to the policy of waiting is the possibility of a sudden rupture of the abscess leading to a most dangerous form of peritonitis.

The mortality rate of acute peritonitis complicating appendicitis has not been materially reduced by the employment of various serums. The benefits of Havlicek's method of ultraviolet irradiation of the intestine in the course of operation for the purpose of releasing histamine-like substances capable of stimulating the portal circulation have not been confirmed by others.

Lowering of the mortality rate of acute appendicitis may follow education of the general practitioner to recognize the atypical forms, strict adherence to the principle of early operation, education of the public to abstain from the use of cathartics in the presence of abdominal pain, and responsibility for the neglected cases by the experienced surgeon rather than by the casual operator.

4. Guerry, Le Grand: A Study of the Mortality in Appendicitis, Ann. Surg. **84**: 283 (Aug.) 1926.
5. Horsley, G. W.: Improved Treatment of Appendicitis, Virginia M. Month. **62**: 598 (Jan.) 1936.

RELATION OF DIETARY CALCIUM AND PHOSPHORUS

The etiologic importance of improper diet in the production of rickets and the demands of the maternal organism for the formation of proper skeletal tissue of the young and for the subsequent lactation period have led to the accumulation of data demonstrating the significance of the ratio of calcium to phosphorus in the food. The normal ratio has been defined as from 2:1 to 1:2. Experimental studies of rickets in rats have demonstrated that diets with this relationship between the calcium and phosphorus will not permit rickets to develop and will cure the condition after it has been produced. The failure of normal deposition of calcium phosphate in the bone is usually attributed to the lack of normal concentration of either calcium or phosphorus (or both) in the blood serum and thus in the fluid bathing the bone. The rôle of calcium and phosphorus in determining reproductive success has been studied much less extensively, probably because the effects resulting from deficiencies of these elements appear only after several reproductive cycles.

The emphasis that has been placed on calcium and phosphorus ratios has in general resulted in a lack of consideration of the absolute amounts of either of these two elements in the diet. The low phosphorus type of rickets, which is believed to be most frequent clinically, is also the type most readily produced experimentally in rats under controlled conditions. Consequently, the distortion of the calcium to phosphorus ratio at the expense of the latter element has generally been employed in the experimental investigation of rickets. However, recent studies of both experimental rickets and the reproductive cycle have varied widely both in the ratios of calcium to phosphorus in the diet and in the absolute amounts of each of these two elements ingested. The interesting data obtained indicate a definite shift in emphasis from one of relative to one of absolute amounts of calcium and phosphorus ingested and serve to illustrate the inadequacy of dealing solely with ratios. Shohl and Wolbach [1] at the Harvard Med-

1. Shohl, A. T., and Wolbach, S. B.: J. Nutrition **11**: 275 (March 10) 1936.

ical School have extended and supplemented earlier investigations of the effects on bone formation in rats of high-calcium low-phosphorus diets to include low-calcium high-phosphorus diets. These investigators have correlated serum values and bone ash determinations with both ratios and levels of intake of these two elements; histologic pathology is also included, together with x-ray examination. This most recent work thus systematically completes a survey of the various calcium to phosphorus ratios and levels attainable with natural foodstuffs. In an equally complete investigation, Cox and Imboden [2] have studied the behavior of experimental rats receiving constant amounts of dietary calcium and phosphorus throughout the entire span of their reproductive life, thus obtaining an index of reproductive success.

The results of the Harvard work clearly indicate the fallacious interpretations that may result from a consideration solely of the calcium and phosphorus ratios of the diet. It seems evident that the absolute amounts of calcium and phosphorus is as important a factor in the production of rickets in rats as is the distortion of the accepted optimal dietary ratio for these two elements. It has been possible to produce rickets in experimental animals ingesting a diet low in both calcium and phosphorus, despite the fact that the calcium to phosphorus ratio in this type of diet was formerly considered "normal." The term "normal ratio," therefore, has thus largely lost its significance, for rickets may be produced with any ratio of calcium to phosphorus. As the absolute amounts of these mineral elements are increased, for any given ratio, the diet changes from a rachitogenic to a nonrachitogenic one. This importance of both level and ratio of these mineral elements is emphasized also by the studies of Cox and Imboden on the success of mother rats in producing and rearing young. A calcium to phosphorus ratio of 1.0, at a calcium level of 0.49 per cent, was established as the optimal level and ratio for successful gestation and lactation in this species. When the calcium level is not exactly known, it seems evident that a calcium phosphorus ratio of 1.0 for the mothers will approximate the optimal, as the highest ash contents of the 21 day old young were obtained with this ratio. At excessive mineral levels of 2.45 per cent, poor performance was obtained irrespective of the ratio. Phosphate in excess appeared to be better tolerated than an excess of calcium.

Although it is not always rational to transpose data obtained with one species to the explanation of normal and pathologic phenomena in another, the correlation of some of the data obtained in these two investigations with data in the literature for human beings is highly suggestive. Rickets in rats seems to bear a closer relation to rickets in infants and dogs than was formerly supposed, in that rickets is produced with diets in which the ratio has been considered "normal," provided the amounts of calcium and phosphorus are sufficiently low. The essentials for the production of rickets thus appear to be an inadequacy of vitamin D accompanied by a relative deficiency of calcium or phosphorus or an absolute deficiency of either or both. The reproduction studies suggest that a calcium to phosphorus ratio of less than 1.0, which has been recommended by Sherman [3] for normal adult maintenance and by Toverud [4] for gestation, may be related to the low calcium intake which, in balance studies, has been observed in human pregnancy. It remains for future investigations to determine why a ratio of less than 1.0 is preferable at low calcium levels, but the importance of the absolute as well as the relative amount of dietary calcium and phosphorus appears to be clearly established by these recent studies.

2. Cox, W. M., Jr., and Imboden, Miriam: J. Nutrition **11**: 147 (Feb.) 1936.

3. Sherman, H. C.: Chemistry of Food and Nutrition, ed. 4, New York, Macmillan Company, p. 512.

4. Toverud, K. U.: Nutritional Condition of New-Born Infants, Am. J. Dis. Child. **46**: 954 (Nov., part 1) 1933.

Current Comment

THE INTERNATIONAL COLLEGE OF SURGEONS—WHY?

Into the welter of scientific, pseudoscientific, medical and similar organizations which now appeal for the physician's patronage comes the International College of Surgeons, promoted by none other than H. Lyons Hunt, who has already to his credit [sic] the Association of Medical Editors and Authors. The prospectus indicates that the purpose of the organization is to bring together in closer harmony the leaders of the various colleges of surgeons now in existence; yet there is not the slightest evidence that the colleges of surgeons in any country have indicated their willingness to be brought together by this new organization. Among other objectives, the new "College" proposes to elevate the standards of surgery to a point at which international reciprocity may be realized; it is quite safe to say that international reciprocity in surgery must be a figment of the imagination for many generations to come. Apparently there will be a publicity department to keep the public informed as to what surgery can accomplish, prizes offered for research, a museum established in Geneva, a journal published and a building erected in Geneva, where the foreign promoter, A. Jentzer, resides. There are also to be annual meetings in the individual countries as well as a meeting every two years in Geneva. Finally, there will be three classes of members, notably members, fellows and masters, who will be entitled to place after their names the appropriate alphabetic insignia. The fellows are to be selected by election, appointment or examination. Apparently the first comers are all being appointed, but by whom and under what authority the prospectus sayeth not. Notwithstanding the obviously inflational character of this prospectus and the complete lack of any well authenticated background for this proposed organization, a considerable number of American physi-

cians have felt themselves highly honored by the receipt of the invitation and are already taking steps to extend the appendix to their names by the additional letters which they will purchase through this international college. There exists already an international surgical organization of standing and repute. No doubt an invitation to membership in this organization would be a considerable honor and well worthy of consideration by any competent surgeon. An invitation to membership in the present promotion might be considered more of an insult to the intelligence of the recipient than a recognition of extraordinary qualifications. One need not cast aspersions on the intelligence of the promoters. As psychologists they seem to have a fine insight into the weakness and folly of the average man, who likes to adorn himself in regalia and to adorn his cognomen with assorted alphabetic conglomerations.

INCREASE IN DUTY ON SURGICAL INSTRUMENTS FROM GERMANY

Beginning on or about July 11, importers of surgical instruments from Germany must, in addition to paying the normal tariff rate on the surgical instruments they import, deposit with the collector of customs an amount equal to 56 per cent of the invoice value of such instruments. This is to be held to cover the payment of an additional duty that it is proposed to levy, pending the ascertainment by the Treasury Department of the exact amount of the increase. The present normal rate of duty on surgical instruments is 55 per cent ad valorem, except in the case of instruments in chief value of glass, on which the rate is 70 per cent ad valorem. Section 303 of the Tariff Act of 1930 provides that whenever an exporting country pays, directly or indirectly, any bounty or grant to the exporter of any article manufactured or produced in that country and that article is dutiable under the act, then, on the importation of that article into the United States, an additional or countervailing duty shall be levied equal to the net amount of the bounty or grant given by the country from which it was exported. Germany, according to data in the files of the Treasury Department, grants certain bounties to exporters of surgical instruments, provisionally estimated by the Treasury Department as 56 per cent of the invoice value of the exported articles. This bounty enables German exporters of surgical instruments to compete in the markets of the United States to the disadvantage of our own domestic manufacturers of such instruments. Because of the bounties thus granted, according to a Treasury Decision approved by the Secretary of the Treasury June 4, 1936, the additional or countervailing duty is to be levied.

The Average Basal Metabolism.—In health, this basal energy metabolism averages about 70 calories per hour per man of average size, or about one calory per kilogram of body weight per hour. This is the minimum rate of expenditure of the normal man or woman when awake. During sleep the energy output is somewhat less, but when sitting erect it is more, while standing involves a still further expenditure of energy. A normal man, therefore, however sedentary he may be, is almost sure to expend in the course of the twenty-four hour day somewhat more than twenty-four times his basal hourly number of calories.—Sherman, H. C.: Food and Health, New York, Macmillan Company, 1934.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Mussel Poisoning and Quarantine.—All mussels from the ocean shore of California from the southern boundary of Ventura County north to the California-Oregon boundary, with the exception of San Francisco Bay, have been placed under quarantine for the period May 19 to September 30, according to the state department of health. This quarantine, established annually, was imposed earlier this year because of two fatal cases of mussel poisoning of residents of Los Angeles who gathered mussels and ate them in Ventura County. Never before have poisonous mussels been discovered so far south in California. Heretofore the quarantine area has extended from Monterey County to the Oregon state line. Since this order was issued it has become necessary to include the coastal area of Los Angeles County and investigations are being made as far south as the Mexican border in order to determine whether poisonous shellfish may be recovered in southern waters of California.

Changes in Medical Faculty.—Dr. LeRoy C. Abbott, clinical professor of orthopedic surgery, University of California Medical School, San Francisco, has been appointed professor of orthopedic surgery, effective July 1. Other changes in the faculty effective at that time include:

Dr. Theodore L. Althausen to associate professor of medicine.
Dr. Evelyn M. Anderson, assistant professor of medicine.
Dr. Aberhardt C. Bost, assistant clinical professor of pediatrics.
Dr. Frederic C. Bost, assistant clinical professor of orthopedic surgery.
Dr. Mary E. Botsford, clinical professor of anesthesia, emeritus.
Dr. Howard A. Brown, assistant clinical professor of surgery.
Dr. Frederick S. Bruckman, assistant clinical professor of medicine.
Dr. Jesse L. Carr, assistant professor of pathology.
Dr. Joseph W. Crawford, assistant clinical professor of ophthalmology.
Dr. William C. Deamer, assistant professor of pediatrics.
Dr. Frederick C. Cordes, clinical professor of ophthalmology.
Dr. William A. Key, assistant clinical professor of orthopedic surgery.
Dr. Fred H. Kruse, clinical professor of medicine.
Dr. Salvatore P. Lucia, assistant professor of medicine.
Dr. Daniel G. Morton, assistant professor of obstetrics and gynecology.
Dr. Edgar J. Munter, assistant clinical professor of medicine.
Dr. Hartzell H. Ray, assistant clinical professor of pediatrics.
Dr. William A. J. Reilly, assistant clinical professor of pediatrics.
Dr. James F. Rinehart, associate professor of pathology.
Dr. Harry C. Shepardson, associate clinical professor of medicine.
Dr. Wallace B. Smith, clinical professor of otorhinolaryngology.

COLORADO

Personal.—At a meeting of the Pueblo County Medical Society, April 7, life membership was conferred on Dr. Thomas A. Stoddard, Pueblo. Dr. Jesse W. White, Pueblo, addressed the society on "Thyroid and Pregnancy."——Dr. Vera H. Jones, Denver, has been named director of maternal and child health and care of crippled children under the state board of health and the social security administration, it is reported.——Dr. Claude E. Cooper is now professor of otolaryngology and head of the department at the University of Colorado School of Medicine, Denver.

Society News.—At a meeting of the Medical Society of the City and County of Denver, June 2, Dr. Robert K. Dixon spoke on "Treatment of Duodenal Ulcer" and Dr. William M. Bane, "Some External Eye Conditions."——At a meeting of the El Paso County Medical Society in Colorado Springs, May 6, speakers were, among others, Drs. Robert A. Youngman on "Pulmonary Hypertension"; Lyle B. Hart, "Cholecystic Disease with Postoperative Liver Shock," and Frederic F. DeMetrovich, "Diverticulitis."——The Fremont County Medical Society was addressed in Canon City, May 25, by Drs. Albert W. Glathar and Harold T. Low, both of Pueblo, on dermatology and tuberculosis of the epididymis and the prostate gland, respectively.

CONNECTICUT

Portrait of Dr. Dodge.—Friends of Raymond Dodge, Ph.D., professor of psychology, Institute of Human Relations, Yale University, New Haven, have presented a portrait of him to the university. The portrait, by Lloyd Bowers Embry of the Yale School of Fine Arts, has been hung in the Institute of Human Relations. Dr. Dodge, who is 65 years old, has been affiliated with Yale since 1924; he has written extensively in his field. His retirement from the Yale faculty has been announced.

Personal.—Dr. George Mansfield Craig has been appointed medical examiner of Haddam.——Dr. Theodore G. Klumpp, assistant clinical professor of medicine in the department of internal medicine at Yale University School of Medicine, has been granted a leave of absence for the academic year 1936-1937 to go to Washington, where he will make a study of glandular and antianemic preparations with the Food and Drug Administration of the U. S. Department of Agriculture.——Dr. Robert V. Boyce has been named acting superintendent of health of Hartford, succeeding Dr. Thomas F. O'Brien, who was granted a leave of absence on account of illness.——Dr. Louis O. LaBella has been appointed health officer of Middletown.

Society News.—At the spring meeting of the Connecticut Association of Public Health and Clinical Laboratories, in Hartford, May 27, Dr. Alfred L. Burgdorf discussed "The Connecticut Marriage License Law," and Dr. Elliott S. Robinson, "Immunologic Application of Placental Extracts."——Dr. Walter I. Lillie, Philadelphia, discussed "Ophthalmological Changes Produced by Intracranial Lesions" before the Fairfield County Medical Association in Bridgeport, April 14, and Dr. Temple S. Fay, Philadelphia, "Diagnosis of Cerebral Tumors."——At a meeting of the Hartford County Medical Association in Hartford, April 7, Judge Newell Jennings of the superior court of Hartford County, among others, spoke on "Expert Medical Testimony."

DISTRICT OF COLUMBIA

Personal.—Dr. Daniel L. Finucane has been appointed associate professor of clinical medicine at Georgetown University School of Medicine, Washington.

The Borden Lectureship.—The William Cline Borden Memorial Lectureship in Surgery has been established at George Washington University School of Medicine by Mrs. William Cline Borden and Dr. Daniel LeRay Borden, wife and son of the former dean of the medical school. The presentation for the Borden family was made at the May meeting of the university medical society by Dr. William Johnston Mallory, professor of medicine; it was accepted by Cloyd Heck Marvin, LL.D., president of the university. Dr. Borden's son, who is associate professor of surgery at George Washington, presented a biographic sketch of his father. It is planned to give the lectures at the medical school annually. Dr. Borden, who died in 1934, was professor of surgery and dean of George Washington University School of Medicine and surgeon in chief of the George Washington University Hospital from 1909 to June 1931.

District Medical Election.—Dr. William Mercer Sprigg, Washington, was elected president of the Medical Society of the District of Columbia, and Dr. Coursen B. Conklin was reelected secretary. The next annual session will be held at Washington, May 5-6, 1937. At the annual scientific assembly of the society, May 6-7, one feature was a "tri-state afternoon," when the following presented the program:

Dr. Upton D. Nourse, Dawsonville, Md., Relation of the General Practitioner to the Specialist in the Larger Centers.
Dr. William Wayne Babcock, Philadelphia, Diagnosis and Treatment of Tumors of the Intestinal Tract.
Dr. James N. Greear Jr., Treatment of Eye Injuries.
Dr. Guy W. Leadbetter, The Painful Shoulder.
Dr. Earle G. Breeding, Causes and Treatment of Deafness.
Dr. Robert Lomax Wells, Basic Clinical Factors in Evaluating Treatment and Prognosis in Hyperthyroidism.

Clinics were also presented and other speakers included:

Dr. Walter Clarke, New York, The New York Plan of Attack on Syphilis.
Dr. James P. O'Hare, Boston, Practical Problems in Glomerulonephritis.
Dr. Chevalier L. Jackson, Philadelphia, Gastroscopy as an Aid to Diagnosis.

ILLINOIS

Society News.—Dr. Howard L. Alt, Chicago, addressed the Marion County Medical Society at Centralia, May 27, on "Use of Blood Chemistry in the Diagnosis and Treatment of Disease."——At a meeting of the Muskegon County Medical Society, May 22, Dr. Oscar B. Nugent, Chicago, spoke on "Diseases of the Eye in Relation to General Medicine."——Dr. Paul H. Holinger, Chicago, discussed bronchoscopy before the Kankakee County Medical Society, May 14.——At a joint meeting of the East St. Louis and Belleville branches of the St. Clair County Medical Society, June 4, Dr. Joseph Edgar Stewart, St. Louis, read a paper on fractures.——At a meeting of the Henry County Medical Society in Kewanee, May 14, Drs. Andrew C. Ivy and Raymond W. McNealy, Chicago, discussed "Therapy of Biliary Tract Disease from the Viewpoint of Applied Physiology" and "Surgical Management of Biliary Tract Disease" respectively.——Dr. John R. Caulk, St. Louis, addressed the Macoupin County Medical Society in May on "Obstruction at the Bladder Neck in Men, Women and Children."——Dr. Aaron Arkin, Chicago, addressed the Peoria City Medical Society, May 26, on "Differential Diagnosis of Organic Heart Disease."——Dr. Frank H. Ewerhardt, St. Louis, discussed "Fever Therapy" before the Adams County Medical Society in Quincy, May 11.——The Vermilion County Medical Society was addressed, May 5, by Dr. James H. Hutton, Chicago, on treatment of hypertension and diabetes by x-rays.

Chicago

Eclamptics Wanted for Study.—The Chicago Lying-In Hospital wishes several cases of eclampsia for study and for a motion picture. Physicians who have worthy indigent patients in this condition are asked to notify the hospital, Plaza 7200. The patients will be sent for and there will be no charge of any kind.

KANSAS

Society News.—At a meeting of the Marion County Medical Society in Marion, May 6, Drs. Wendell M. Tate, Peabody, and Abraham C. Eitzen, Hillsboro, discussed "Leukemia with Its Nervous Manifestations" and "Epidemic Encephalitis" respectively.——The Greenwood County Medical Society was addressed in Eureka, May 6, by Dr. John L. Kleinheksel, Wichita, among others, on "Diabetes in Pregnancy" and "Diabetes as Associated with Hardening of the Arteries."——Dr. Daniel V. Conwell, Halstead, read a paper on "Organic Psychosis" before a recent meeting of the Northwest Kansas Medical Society in Norton, and Dr. Charles F. Taylor, Norton, gave an illustrated talk on a visit to the leper colony at Carville, La.——Dr. Lerton V. Dawson, Ottawa, discussed medical economics before the Osage County Medical Society in Alta Vista, May 29.——Dr. Ferdinand C. Helwig and Boyd S. Gardner, D.D.S., Kansas City, Mo., addressed a joint meeting of the Sumner County medical and dental societies in Wellington, May 28, on treatment of Vincent's angina by electrocoagulation.

LOUISIANA

Bills Introduced.—S. 241 proposes to enact an entirely new workmen's compensation act. Among other things, it proposes to require an employer (1) to pay the compensation stated to an employee who has received "personal injury by accident arising out of and in the course of such employment" and (2) to "*pay for* reasonable medical, surgical and hospital services and medicines not to exceed $250 in value, unless the employee refuses to allow them to be paid for by the employer." The italicized words seem particularly significant in view of the provision in the present workmen's compensation act which requires an employer "*to furnish*" reasonable medical, surgical and hospital services, and medicines in the amount noted above to injured workmen. This possibly leaves an inference that, if the present bill is adopted unaltered in this respect, an injured workman will have the right to select his own physician and thus render the employer liable within the limits noted above. S. 251 proposes to create a board of chiropractic examiners and to regulate the practice of chiropractic, defined as "the science of palpating and adjusting the articulations of the human spinal column by hand only." All persons of good moral character who have been continuously engaged in the practice of chiropractic in the state for twelve months prior to the passage of this bill are to be licensed without examination even though they have engaged in such practice in violation of the present law. All other applicants for licenses must be graduates of a school or college teaching chiropractic and giving a course of at least three years of six months each in anatomy, physiology, symptomatology, hygiene, sanitation, chiropractic analysis and principles and practice of chiropractic. H. 361 proposes to provide that physicians, midwives and other persons who are required to file certificates of births and deaths to the appropriate state or county officials shall be entitled to receive 25 cents for each certificate thus filed. H. 501 proposes to exempt licensed chiropodists from paying any state, city or parish license fees. H. 572, to amend the medical practice act, proposes to permit a person legally engaged in the business of refracting or fitting glasses to the human eye to use the title "optometrist." H. 659, to amend the dental practice act, proposes so to define unprofessional conduct, which is a ground for the revocation of a license to practice dentistry, as to embrace (1) all advertising other than the display of a professional card at the licentiate's place of business, (2) advertising through the press, on the radio or by the use of hand-

bills, circulars or periodicals other than professional cards stating only the name, address, profession, office hours and telephone connections of the licentiate, and (3) employing or making use of advertising solicitors or publicity agents or soliciting employment personally or by representatives. H. 681 proposes to create a "School Children's Health and Medical Board" to consist of three physicians, to be appointed by the governor for four year terms. The duties of the proposed board are to examine all school children of the state annually, to file a report of the findings of those examinations with the state board of education and to mail the parent or guardian of each child so examined a written report of the examination. The bill proposes to authorize an annual appropriation of $200,000 to carry the proposed provisions of the bill into effect. S. 45 proposes to prohibit a physician from disclosing in any legal proceedings, except at the instance of his patient, any communication made to him by a patient under his charge or by one seeking professional advice. H. 347 proposes to enact a "state food, drugs and cosmetic act" and to repeal all laws in conflict therewith. The present laws proposed to be repealed conform closely to the present federal Pure Food and Drugs Act of 1906. The provisions of H. 347, on the other hand, correspond closely to the provisions of United States S. 5, the Copeland bill, as it was reported out of committee in the United States House of Representatives, May 22, 1936, which was discussed and adversely criticized in THE JOURNAL, May 30, pages 1896-1898.

MICHIGAN

Program of Maternal and Child Health.—A program of maternal and child health in Michigan, covering principally rural areas, was approved at a meeting of the house of delegates of the state medical society April 30. The plan, submitted by the state health department, provides that before a program is set up in a county it must be approved by an advisory board appointed by the county medical society. Further, it will not include clinics, treatments or advice with reference to treatment of any kind, embracing only the cooperation of the private physician. Contemplated lectures to lay groups must first be presented in synopsis form to the advisory committee, while copies of the lecture must be given to each member of the society. Overactivity of lay groups as a result of this educational program will be discouraged and curtailed as far as possible according to the advice of the advisory committee of physicians, the state medical journal reports.

Anniversary Microscope Presented to Dr. Novy.—Dr. Frederick G. Novy, professor of bacteriology and chairman of the executive committee of the University of Michigan School of Medicine, Ann Arbor, was presented with a microscope at a luncheon for members of the American Association for the Advancement of Science in Rochester, N. Y., June 18. Edward Bausch, chairman of the board of directors of the Bausch and Lomb Company, made the presentation, and Dr. Novy gave an address entitled "Some Results of Microscopic Research Which Have Been of Significance for Human Welfare." This was the 250,000th microscope manufactured by Bausch and Lomb. The first instrument completed by this company was shown at the Philadelphia Centennial Exposition in 1876. This occasion also commemorates the fiftieth anniversary of Dr. Novy's graduation from the University of Michigan. Dr. Novy has been associated with Michigan since 1886. He became professor of bacteriology and director of the Hygienic Laboratory at the school in 1902; he has been chairman of the executive committee and faculty of the medical school since 1930 and is also dean.

MINNESOTA

Illegal Practitioners Sentenced.—Ramon L. De Silvio was sentenced to one year at hard labor in the St. Louis County Work Farm by Judge Edward Freeman, May 2, following his plea of guilty to practicing without a basic science certificate. He had recently been treating patients in Hibbing. De Silvio, a Negro, admitted he had falsely represented himself as a chemist and that he had never had any education above the sixth grade in school. He also admitted that he had been arrested for a similar offense in Boston. He had collected sums of money ranging from $2.50 to $17 per patient. Mrs. Frances Stauch, Albert Lea, was sentenced to one year at hard labor in the woman's reformatory at Shakopee, April 21, by Judge Brill. She pleaded guilty to having performed an abortion, stating that she had no medical education except "such as she acquired as a practical nurse on a few occasions in Albert Lea."

MISSISSIPPI

Changes in Hospital Superintendents.—Dr. John S. Hickman, Philadelphia, a member of the state legislature, has been appointed superintendent of the East Mississippi Hospital, Meridian, succeeding Dr. Russell R. Welch. The appointment was effective June 1.——Dr. Louis M. Magee, Prentiss, has been named to succeed Dr. William K. Stowers as superintendent of the State Charity Hospital, Natchez.——Dr. Thomas R. Beech, Ellisville, has been appointed superintendent of the South Mississippi Charity Hospital, Laurel; he succeeds Dr. Alcus J. Carter.——Dr. Toxey E. Hall, Shelby, has been designated superintendent of the State Charity Hospital at Jackson, succeeding Dr. DeWitt T. Brock. The appointment was effective June 1.

MONTANA

State Medical Meeting at Billings.—The fifty-eighth annual meeting of the Medical Association of Montana will be held at the Commercial Club, Billings, July 8-9, under the presidency of Dr. Louis H. Fligman, Helena. Dr. James I. Wernham, Billings, president of the Yellowstone Valley Medical Society, will give the address of welcome, and Dr. Harry J. McGregor, Great Falls, vice president of the state association, the response. Speakers will include:

Dr. Roscoe C. Webb, Minneapolis, Fractures.
Dr. William A. O'Brien, Minneapolis, Treatment of Anemia; Indications for Radiation Therapy.
Dr. Anthony J. Lanza, New York, Newer Methods of Diagnosis and Treatment of Pneumonia.
Dr. Ernest D. Hitchcock, Great Falls, Highlights in Routine Gastric Examinations.
Dr. Henry Schmitz, Chicago, Is There a Period of Absolute Sterility in Women? Report of Treatment of Pelvic Carcinomas with 800 Kilovolts After Thirty Months.
Dr. Lawrence M. Randall, Rochester, Indications for Cesarean Section.
Dr. Edward S. Murphy, Missoula, Montana's Pioneer Physician.
Dr. Arthur J. Movius, Billings, Subphrenic Abscess.
Dr. Allen R. Foss, Missoula, Manifestations of Allergy in General Practice.

The Health Association of Montana will meet in the Commercial Club, July 6-7, and the Montana Academy of Oto-Ophthalmology, July 7, in the Northern Hotel.

NEBRASKA

Society News.—Drs. Abram E. Bennett and Robert D. Schrock, Omaha, addressed the Madison Six Counties Medical Society at Norfolk, April 21, on "Artificial Fever Therapy Results Obtained with the Kettering Hypertherm" and "Fractures at the Elbow and About the Knee Joint" respectively. ——Speakers at the spring meeting of the Third Councilor District Medical Society in Auburn, April 28, were the following members of the faculty of Creighton University College of Medicine, Omaha: Drs. Raymond L. Traynor, on "Treatment of Heart Failure"; Ernest Kelley, "The Doctor and His Nervous Patients"; Charles McMartin, "Diagnosis of Surgical Diseases of the Kidney," and Frederick J. Schwertly, "Infections of the Hands."

NEW HAMPSHIRE

State Medical Election.—Dr. Frank E. Kittredge, Nashua, was elected president of the New Hampshire Medical Society at its meeting in Manchester, May 27. Dr. Samuel T. Ladd, Portsmouth, was elected vice president and Dr. Carleton R. Metcalf, Concord, reelected secretary. Next year's meeting will be held in Manchester.

NEW YORK

University News.—Dr. Joseph C. Doane, medical director of the Jewish Hospital, Philadelphia, will give a short course in hospital operation at Cornell University, Ithaca, in the two weeks beginning June 29. Admission is limited to those who are or have been actively engaged in hotel or hospital work. ——The Rockefeller Foundation has recently made two grants totaling $16,400 to the University of Rochester School of Medicine and Dentistry. One of $10,000 will be used for investigation of filtrable viruses under the direction of Dr. George Packer Berry, professor of bacteriology and associate professor of medicine; one of $6,400 will be used to aid Dr. Stafford L. Warren, associate professor of medicine and radiology, in a study of the biologic effects of heat.

New York City

Personal.—Dr. Frank Lusk Babbott Jr., president of Long Island College of Medicine, was one of six alumni of Columbia University who received the university medal for achievement since graduation. Dr. Babbott graduated from the College of Physicians and Surgeons in 1918.

Society News. — At a meeting of the International and Spanish-Speaking Association of Physicians, Dentists and Pharmacists, April 24, a symposium on arthritis was presented by Drs. Gertrude J. Chandlee, Jaques Kroner, Joseph Echtman and S. Epstein and Max Balaban, D.D.S. Dr. Jacob M. Gershberg was recently reelected president of this society; Dr. Reginald Burbank is general secretary and Dr. Emilio L. Hergert, recording secretary. —— Dr. Charles R. Stockard addressed the New York Pathological Society, May 28, on "Hereditary Early Death in Localized Neurons with Resulting Paralysis in Dogs" and Drs. Eugene Clark and Adolph R. Berger, on "Hemorrhagic Extravasations into Valvular Leaflets and Their Relationship to Pulmonary Embolism."

Symposium on Typhoid Carriers.—An all day session of discussions of the typhoid carrier problem was held at New York Post Graduate Hospital, June 6, under the auspices of the combined medical and surgical clinic for the study of disease of the liver and biliary tract. Dr. Charles Gordon Heyd, Vice President of the American Medical Association, demonstrated cholecystectomy for cure of the carrier state and members of the faculty of New York Post Graduate Medical School spoke as follows: Drs. Eilif C. Hanssen, on "Treatment of Typhoid Carriers"; Ward J. MacNeal, "Bacteriology of Typhoid Infection"; John Russell Twiss and Bernard Marraffino, "Biliary Drainage in Detection and Release of Typhoid Carriers." In the afternoon the following program was presented:

Dr. Millard Knowlton, Hartford, Conn., The Typhoid Carrier Problem in Connecticut.
Dr. Irvin E. Deibert, Camden, N. J., Results Following Cholecystectomy in Typhoid Carriers in the State of New Jersey.
Dr. Ernest L. Stebbins, Albany, N. Y., Detection and Control of Typhoid Carriers.
Dr. Samuel Frant, New York, The Typhoid Carrier Situation in New York City.

NORTH CAROLINA

Department for Crippled Children Established. — The state department of health has recently established a department for crippled children in cooperation with the Children's Bureau of the U. S. Department of Labor, in the administration of the Social Security Act. Objectives outlined in the bulletin of the health department are to locate crippled children, of whom it is estimated there are about 20,000 in the state; to obtain expert diagnosis in all parts of the state; to provide expert treatment and hospital care; to establish a field supervisory service and follow-up service, and to engender public interest in the problem of the crippled child.

Society News.—The Catawba Valley Medical Society met in Morganton, May 26, with the following guest speakers, all of New York: Drs. John Russell Twiss, on "Differential Diagnosis and Clinical Management of Different Types of Gallbladder Disease"; Milton A. Bridges, "Dietary Management of Gallbladder Disease," and Rupert Franklin Carter, "Diagnosis and Management of Surgical Conditions with Respect to the Gallbladder." Dr. Isaac H. Manning, Chapel Hill, spoke on the Hospital Saving Association of North Carolina.——At the spring meeting of the Tenth District Medical Society at Spruce Pine, May 27, guest speakers included Drs. Olin B. Chamberlain, Charleston, S. C., on "Spastic Children" and Edward T. West, Johnson City, Tenn., "Appendicitis."

NORTH DAKOTA

Society News.—Dr. Edgar A. Pray, Valley City, has been elected president of the North Dakota Anti-Tuberculosis Association. —— Dr. Leonard W. Larson, Bismarck, was elected president of the North Dakota Health Officers' Association at its annual meeting in Jamestown May 18.——Dr. Archibald D. McCannel, Minot, addressed the Stutsman County Medical Society in April on modern economic aspects of medicine.—— Dr. John P. Miller, Grand Forks, was elected president of the North Dakota Academy of Ophthalmology and Otolaryngology at the annual meeting in Jamestown, May 18, and Dr. Frederick L. Wicks, Valley City, was reelected secretary. Dr. Erling W. Hansen, Minneapolis, was the guest speaker on "Allergy in Ophthalmology."

OHIO

Public Health Association Meeting.—Dr. Edgar R. Hiatt, Troy, was reelected president of the Ohio Public Health Association at the annual meeting in Columbus, May 14. Among speakers were Drs. Allen W. Freeman, Baltimore, on "Fundamentals in Public Health Organization Needed in Ohio"; George M. Curtis, Columbus, "Compression Therapy," and Louis I. Dublin, Ph.D., New York, "Analysis of the Tuberculosis Mortality Figures for the Past Thirty-Five Years."

Society News. — Drs. Charles I. Stephen, Ansonia, and Howard V. Dutrow, Dayton, addressed the Darke County Medical Society, Greenville, May 15, on "Hemophilia" and "Ethical, Political and Economic Changes in Medicine" respectively.——Dr. John W. McCammon, Cincinnati, addressed the Marion Academy of Medicine, May 5, on "Disabilities of the Feet."——Speakers at a meeting of the Putnam County Medical Society, Ottawa, May 6, were Drs. Frank C. Anderson, Mount Vernon, and Paul M. Holmes, Toledo, on "Diagnosis of Tuberculosis" and "Surgery in Tuberculosis" respectively. ——At a meeting of the Columbiana County Medical Society, Lisbon, May 19, speakers included Drs. Jacob W. Schoolnic, East Liverpool, on "The Present Status of Treatment of Endocrine Disturbance"; Virgil E. McEldowney, Newell, W. Va., "Prevailing Therapy in Treatment of Hay Fever," and Lea A. Cobbs, Salem, "Significance of Arterial Hypertension." —— At a meeting of the First District Medical Society in Wilmington, May 5, speakers were Drs. Malcolm O. Cook, Hamilton, on "Diagnosis and Treatment of Intestinal Obstructions"; Hugh C. Schick, Xenia, "Toxemias of Pregnancy"; Russell L. Haden, Cleveland, "Study and Treatment of Anemia," and Willis D. Gatch, Indianapolis, "Recognition and Treatment of Bowel Obstruction."——Dr. George B. Magrath, Boston, addressed the Montgomery County Medical Society, Dayton, at its annual dinner meeting, June 5, on his experiences as a medical examiner.

OKLAHOMA

Clinical Conference at Tulsa.—The Tulsa Clinical Society presented its spring clinical conference June 10-11. Clinics were presented at Morningside and St. Johns Hospitals and there was a program of addresses at the Mayo Hotel Tuesday afternoon. Tuesday evening there was a banquet with Dr. Edward H. Cary, Dallas, Texas, as the guest speaker. Thursday afternoon was devoted to a golf tournament at the Avery Golf Club, followed by a barbecue dinner at the farm of Dr. Fred A. Glass at Owasso. Officers of the Tulsa Clinical Society are Drs. James C. Brogden, president; Russell C. Pigford, vice president, and Roger Q. Atchley, secretary.

PENNSYLVANIA

Society News. — Dr. Franklin L. Payne, Philadelphia, addressed the Lycoming County Medical Society, Williamsport, June 12, on "Significance of Abnormal Bleeding at the Time of and After the Menopause." At an evening session Dr. Payne conducted a seminar and open discussion on menopausal abnormalities.——A symposium on hyperthyroidism was presented at a meeting of the Fayette County Medical Society, Uniontown, June 4, by Drs. Lucian D. Johnson, Connellsville, Elliott B. Edie, Clark M. Luman and Herbert Lund, all of Uniontown. ——Dr. Paul P. Riggle, Washington, addressed the Washington County Medical Society, Washington, May 13, on "Etiology and Treatment of Peptic Ulcer."——Dr. James M. Blackwood addressed the Lawrence County Medical Society, New Castle, June 4, on "Tumors of the Eyeball."

Philadelphia

Personal.—Dr. Leroy M. A. Maeder has resigned as medical director of the Pennsylvania Mental Hygiene Committee to devote his time to private practice.——Dr. William H. Teller was the guest of honor at a dinner, May 20, at the Warwick, celebrating fifty years of continuous service to the Jewish Hospital. The staff and association of ex-residents were hosts.

University News.—Dr. Isidor S. Ravdin, J. William White professor of surgical research in the University of Pennsylvania School of Medicine and professor of surgical research in the Graduate School of Medicine, has been appointed to the newly established George L. and Emily McMichael Harrison professorship of surgery at the university. The department of research surgery was established under the terms of the will of the late Mr. Harrison, who provided that the income of his residuary estate, approximating $40,000 a year, be used for this purpose.

TENNESSEE

Health at Nashville. — Telegraphic reports to the U. S. Department of Commerce from eighty-six cities with a total population of 37 million, for the week ended June 6, indicate that the highest mortality rate (21.1) appeared for Nashville and the rate for the group of cities as a whole was 11.6. The rate for Nashville for the corresponding week of 1935 was 17.5 and that for the group of cities, 11.4. The annual rate for the eighty-six cities for the twenty-three weeks of 1936 was 13.2 as against a rate of 12.4 for the corresponding period of last year. Caution should be used in the interpretation of

these weekly figures, as they fluctuate widely. The fact that a city is a hospital center for a large area or that it has a large Negro population may tend to increase the death rate.

Sectional Association Meetings.—The West Tennessee Medical and Surgical Association held its forty-fifth annual session in Jackson, May 21, under the presidency of Dr. James L. McMillan, Decaturville. Among speakers were Drs. Shields Abernathy, Memphis, on "Early Diagnosis and Prevention of Cancer"; Tinsley R. Harrison, Nashville, "Cardiovascular Emergencies"; Willis C. Campbell, Memphis, "Physiologic Principles Applied to the Treatment of Fractures," and Jere L. Crook, Jackson, "Personal Experiences in the Use of Radium for Relief of Cancer." Dr. Erle W. Hillsman, Trezevant, was elected president.——The Upper Cumberland Medical Society held its annual meeting at Red Boiling Springs, June 16-17. Among guest speakers were Drs. William E. Gardner, Louisville, Ky., on "Advantageous Neurotic Reactions"; Carl C. Howard, Glasgow, Ky., "Conquest of Pain"; Franklin Jelsma, Louisville, "Diagnosis and Treatment of the More Common Brain Lesions," and Walter L. Rucks, Memphis, "Abdominal Pain in Children."

TEXAS

Health Education Campaign.—The state health department has announced a program of public health education to be financed with a grant from funds made available by the social security act. The first activity will be a campaign in connection with maternal and child health, carried out in cooperation with the state medical association. A two day refresher course for physicians will be presented in three towns in each councilor district of the association, under the direction of the councilor, assisted by a committee composed of an obstetrician, a pediatrician and a general practitioner. In addition a public health program will be presented on the evening of the two-day meeting. The committee on maternal welfare of the state medical association has been asked to serve as an advisory committee to the state department of health. This committee has been enlarged to ten members and has changed its name to "committee on maternal and child health." Members are Drs. Calvin R. Hannah, Dallas, chairman; William W. Maxwell, San Antonio; George H. Beavers Jr. and Caleb O. Terrell, Fort Worth; Willard R. Cooke and William Boyd Reading, Galveston; Corwin L. Maxwell, Myra; Hugh Leslie Moore, Dallas; George W. Edgerton Jr., Harlingen, and Samuel E. Thompson, Kerrville.

VIRGINIA

University News.—Dr. Albert M. Snell, Rochester, Minn., addressed the University of Virginia Medical Society, May 7, on "Pathologic Physiology of Common Duct Stone." Dr. Frederick M. Hodges, Richmond, spoke April 27 on "X-Ray Therapy of Skin Infections."

WASHINGTON

Society News.—Dr. George Warren Pierce, San Francisco, addressed the King County Medical Society, Seattle, May 18, on "Problems of Reconstruction Surgery." At an extra meeting June 1 Dr. Laurence Selling, Portland, Ore., spoke on "Urologic Complications of Pernicious Anemia."——The Seattle Surgical Society held a clinic meeting at Harborview Hall, June 6, in honor of Dr. Albert I. Bouffleur. At a morning session there were clinics on fractures; the afternoon was devoted to traumatic surgery. At a dinner at the Rainier Club Dr. Homer D. Dudley and E. S. Franklin discussed medical and legal aspects, respectively, of "Evaluation of Disability." Dr. William C Speidel introduced Dr. Bouffleur, who related experiences of his long practice. Dr. Bouffleur, now 72 years old, was at one time assistant professor of surgery, Rush Medical College, Chicago.

WISCONSIN

Opening in Tuberculosis Work.—The state bureau of personnel announces an examination for a position as senior physician at the state tuberculosis sanatorium at Wales. The closing date for filing is July 3. Application blanks may be obtained from the bureau at the state capitol, Madison. The salary is $200 a month less complete maintenance, subject to departmental waiver. Among the minimum qualifications for applicants are a license to practice in Wisconsin or eligibility for such a license; extensive experience in an institution; and familiarity with laws, rules and regulations relative to medical work in state institutions.

GENERAL

Medical Bill in Congress.—*Change in Status:* H. R. 12556 has been favorably reported to the Senate, without amendment, proposing to enact a Treasury Agency Organization Act. This bill proposes to create a Treasury Agency Service and to authorize the Secretary of the Treasury to coordinate the functions of investigation, detection or prevention of the violations of law conferred on the new Agency Service with the performance of the functions of investigation, detection or prevention of the violations of the narcotic laws conferred or imposed by law on the Bureau of Narcotics.

Bequests and Donations.—The following bequests and donations have recently been announced:

Presbyterian Hospital, Philadelphia, $35,000 from a trust estate left by Andrew Blair, who died in 1898.

Methodist Episcopal Hospital, Philadelphia, $25,000 by the will of Miss Sarah Elizabeth Simpson.

Hahnemann Hospital, $20,000, and Philadelphia Home for Incurables, $10,000 in trust funds left by the late Isaac W. Jeanes.

Salem City Hospital, Salem, Ohio, $2,000 to endow two free rooms, from the will of Howard F. Stratton, Swarthmore, Pa.

Children's Hospital, Philadelphia, $10,000 in trust from the estate of Howard Fuguet.

St. Luke's and Presbyterian hospitals, Chicago, $25,000 each by the will of William O. Goodman.

University of Pennsylvania School of Medicine, Philadelphia, $10,000 by the will of the late Dr. William M. Mastin, Mobile, Ala., a graduate of 1874.

New York Hospital, New York, $50,000, and Nassau Hospital, Mineola, L. I., $25,000 by the will of Lewis Cass Ledyard Jr.

Rockefeller Institute and Lebanon Hospital, New York, $10,000 each, and Beth Israel Hospital, New York, $6,000 by the will of the late Joseph Leblang.

Rush Hospital and Oncologic Hospital, Philadelphia, $1,500 and $1,000 respectively by the will of the late Margie S. Norton.

Lankenau Hospital, Philadelphia, $5,000 by the will of Carl Grubnau to endow a free bed.

New York University College of Medicine and New York Eye and Ear Infirmary, $5,000 each by the will of the late Dr. Edward B. Dench.

Brooklyn Jewish Hospital, $1,000 by the will of the late Mrs. Rachel Levy.

Society News.—Henry H. Donaldson, Ph.D., Philadelphia, was elected president of the American Neurological Association at the annual session in Atlantic City, June 3. Drs. Samuel D. Ingham, Los Angeles, and Edwin G. Zabriskie, New York, were elected vice presidents and Dr. Henry A. Riley, New York, was reelected secretary.——Dr. Frederick J. Taussig, St. Louis, was elected president of the American Gynecological Society at its annual meeting in Atlantic City May 26. Drs. George W. Kosmak, New York, and Sidney A. Chalfant, Pittsburgh, were elected vice presidents and Dr. Richard W. Telinde, Baltimore, secretary.——Dr. Gilbert J. Thomas, Minneapolis, was elected president of the American Urological Association at its annual meeting in Boston, May 20. Dr. Clyde L. Deming, New Haven, Conn., was elected secretary.——Dr. George M. Coates, Philadelphia, was elected president of the American Laryngological, Rhinological and Otological Society at its annual meeting in Denver, May 18-20. The following vice presidents were elected: Drs. De Forest C. Jarvis, Barre, Vt.; Charles D. Blassingame, Memphis, Tenn.; Alfred Lewy, Chicago; Frederick A. Figi, Rochester, Minn., and David R. Higbee, San Diego. Dr. Carlton Stewart Nash, Rochester, N. Y., was elected secretary.

Government Services

Examination for Public Health Service

The U. S. Public Health Service announces that an examination for entrance into the service will be held in Washington, D. C., June 29. Immediate application should be made to the surgeon general by those who wish to take the examination. Applicants must be graduates of class A medical colleges and not more than 39 years old at the time of the examination. Following are the minimum requirements: three years of college premedical work, four years of medical education with a medical degree, two years of graduate instruction or work in research and two additional years devoted to the subject in which graduate instruction was received or to research. The entrance salary is $3,339 for appointees without dependents, $3,798 for those with dependents. The examination will consist of a thorough physical examination and academic, professional and general fitness tests, all of which consumes approximately about one week. Candidates must defray their own traveling expenses to Washington.

Foreign Letters

LONDON

(From Our Regular Correspondent)

May 2, 1936.

The Medical Aspects of Abortion

The law concerning abortion is unsatisfactory. It lays down penalties for "unlawfully" inducing abortion without stating what is lawful induction. Hence physicians are often unwilling to perform therapeutic abortion owing to uncertainty as to the legal risk. Therefore in 1934 the council of the British Medical Association appointed a committee consisting of obstetricians and others to report on the medical aspects of abortion. This committee has now made a lengthy report. It has been suggested that the physician need have no uncertainty as to his freedom to induce abortion, as the law is adaptable in practice, although not in theory, to changes in social thought. But the committee replies that the responsibility of interpreting public opinion on such matters should not be placed on the physician. Further, physicians differ widely in their views and in their practice. As an example, pregnancy following rape below the age of consent may be taken. The law seems to imply that pregnancy in a girl of 13, whose pelvis is too small for safe delivery, should be carried to term for cesarean section. What is the wish of the community? Some physicians would refuse to induce abortion, while others would not hesitate. A similar difference exists as to abortion for eugenic reasons. Leading physicians submitted memoranda to the committee. It is generally believed that termination of pregnancy in the early months is legal when carried out with the object of safeguarding the mother's life or health. Nevertheless the law leaves the physician exposed to risks. It is not only conviction which is dreaded; indictment, however unjustifiable, may damage his reputation. The result is that he may demur to perform therapeutic abortion, with risk of sacrifice of the health or life of the patient. While it is impossible to provide exact indications for the induction of abortion, the committee considers that the law should at least contain an explicit statement of the principles of the lawful termination of pregnancy. But this would not remove all difficulties, for differences of opinion with regard to the urgency of the medical indications may expose an honorable physician to the risk of his judgment being publicly impugned, even when he is protected against the major risk of criminal intent. To safeguard him the committee suggests that abortion should be carried out only on the approval of two physicians. To remove any question of collusion, one might have some recognized status in the matter.

THE INDICATIONS FOR THERAPEUTIC ABORTION

The committee summarizes at length the indications for therapeutic abortion. In heart disease a previous attack of congestive heart failure is a certain indication. Congestive heart failure during the first three months is not common, but when it occurs so early the uterus should be emptied after suitable preoperative treatment. Other indications are auricular fibrillation, repeated hemoptyses, paroxysmal tachycardia, mitral stenosis with evidence of antecedent embolism, myocardial degeneration, arterial disease with high blood pressure, enlarged heart and progressive bacterial endocarditis.

Of renal conditions, chronic nephritis is an indication not only because of the damaging effect of pregnancy on the kidneys but also because of the liability of the death of the fetus. A history of eclampsia or preeclampsia in a previous pregnancy with recurrence of symptoms at an early stage of a subsequent pregnancy may necessitate induction. So may severe pyelitis or tuberculosis.

Of pulmonary conditions, tuberculosis is largely the problem. In active tuberculosis the question should be considered in the early months. After the third or the early part of the fourth month the effects of the disease are as marked after intervention as if the pregnancy had been allowed to proceed. In acute rapidly spreading disease, even in the early months, induction as a rule is of little use. But when there is a history of antecedent active disease and indications of recent activity are found, and especially if there is evidence of laryngeal or intestinal lesions, abortion is indicated in the early months. In arrested tuberculosis the pregnancy should be allowed to continue.

Blood conditions—leukemia, Hodgkin's disease, splenic or aplastic anemia, refractory pernicious anemia and thrombocytopenia—may be indications. Eugenic considerations are generally regarded as outside the scope of therapeutic abortion, but the committee believes that there may be justifiable indications. The offspring of two mental defectives will almost certainly be mentally defective. Therapeutic abortion should then be considered. Other cases in which it might be thought allowable are (1) if the father and one child are mental defectives, (2) if the father is psychopathic and one child a mental defective, and (3) if two mentally defective children have already been born.

Investigation of Causes of Road Accidents

The Ministry of Transport has begun a new investigation of the circumstances and causes of road accidents. Particulars of every accident, whether fatal or not, are being noted by the police and will be forwarded to the ministry for examination and analysis. This inquiry will reveal for the first time how many of the 200,000 persons injured yearly on the roads of Great Britain are only slightly hurt and how many escaped death at the cost of maiming or serious injuries. In deciding on a wider inquiry the ministry was influenced by the fact that the 6,000 to 7,000 fatal cases investigated since the beginning of last year form about 3 per cent of the total accidents involving personal injury. When reporting accidents the police will in future record the general character of the road (whether residential, shopping or business), the presence or absence of street car tracks, the width of the roadway, the weather and light, and features such as road junctions, subways or marked pedestrian crossings within a specified distance of the accident. Notes will be made of the age and sex of the persons involved and of their movements and those of the vehicles concerned immediately before the accident. The inquiry will show for the first time how many accidents occur where a speed limit is in operation and where there is no speed limit. In every case the police will be asked to state the main and contributory causes of the accidents, and these have been codified under sixty-four heads. These facts will be entered on a printed form.

SAFER ROADS FOR CHILDREN

Already forty-three children under 15 have been killed in London this year. A committee appointed by the board of education and the ministry of transport to advise on the promotion of safety among school children has made a most searching inquiry into the causes of road accidents among children. In their report they state that at the outset they were impressed by the serious character of the problem, its rapid growth in recent years and the complexity of the causes. Nothing less than sustained national effort, toward which every road user should contribute, will suffice to overcome this appalling menace to child life. In 1920, 857 children under 15 were killed in road accidents. By 1930 the figure had risen to 1,433. Since then the numbers have slightly declined, but in 1933 the total was 1,245. In London the fatal accident rate in 1921 was 9 per hundred thousand of the child population. In 1933 this had risen to 13. For the same two years the rates for nonfatal

accidents were 297 and 617. Analysis of the fatal accident rate for London shows that it rises rapidly from the age of 2 and is highest between the ages of 4 and 8. After this there is a decline, but after 12 there is an increase caused by fatalities among child cyclists. At all age periods more boys than girls are killed, probably because they are more venturesome. Among the causes of accidents to children are playing in the carriage way, impulsiveness, inexperience, the stealing of rides on cars, and cycling. Allowing children to ride bicycles too large for them or not in roadworthy condition increases the risk. One source of accident is the riding of scooters.

The committee makes fifty-one recommendations. These include far more drastic regulations concerning road traffic. County councils should set up children's safety committees to make periodic surveys of their areas from the point of view of road safety, including protection at road crossings near schools. Children under 7 should not be allowed on the highway unaccompanied. The most effective safeguard at busy road crossings near schools is a police constable, but authorized adult patrols might be tried. A conspicuous school sign which gives warning when children are entering or leaving school is advocated. More playing fields should be provided to keep the children off the streets. Where traffic conditions are dangerous, children should be prohibited from cycling to school. Young children should be instructed in elementary matters of road safety. The minister of transport has already authorized a special portable road sign for persons assisting children to cross the road. In large red letters on a white ground is "Stop" followed by "Children Crossing."

The New Midwifery Service

In the house of commons Sir Kenneth Wood, minister of health, moved the second reading of the midwives bill, the purpose of which is to establish a service of salaried trained midwives, so that every expectant mother, whatever her circumstances, can obtain a qualified midwife. The bill is also designed to raise the status of the midwifery profession by providing adequate salaries and facilities for further instruction. In the last ten years nearly 2,000 mothers have died annually in childbirth. The failure of maternal mortality to yield hardly a decimal point to sustained attacks has been a matter of national concern, contrasting with the notable results in the case of infant mortality. Last year the government spent over $15,000,000 on maternity and child welfare, yet the maternal mortality was not substantially reduced.

The local authorities will control the new service. They will fix the salaries of the midwives employed by them and the fees to be charged. A midwife now practicing can either apply for a salaried post or continue her independent practice. On the other hand, she can within three years of the coming into operation of the new scheme surrender her practicing certificate and receive as compensation thrice the average of her emoluments for the preceding three years. The local authority can call on old or infirm midwives, unable to perform their duties satisfactorily, to retire, in which case they will receive five times the net value of their practice in the preceding three years. Arrangements are provided to enable midwives to keep abreast of current practice by attending refresher courses. The government will assist the local authorities by supplying approximately half the total additional cost incurred for the service. But the government grant will vary with the needs of the area from 25 or 30 per cent in the richest areas to 80 per cent in the poorest.

The local authorities will also be encouraged to develop further their antepartum clinics, which have increased by 20 per cent since 1931. The case of London has been specially considered, as salaried midwives are already provided by the London voluntary hospitals and about 25 per cent of the labors take place in municipal hospitals, where there are antepartum clinics and specialists in all branches of maternity work. The new salaried midwives will have these services at their back and can enlarge their experience by taking duty in the hospitals when not engaged in domiciliary work.

PARIS

(From Our Regular Correspondent)

May 1, 1936.

Infant Vaccinated with BCG Infected by Tuberculous Parent

At a meeting, March 27, Weill-Hallé and Mouchotte reported a case showing that BCG vaccination of the new-born against tuberculosis can be rendered ineffective if the infant remains in contact with parents having pulmonary tuberculosis. The infant was brought to the crèche at the age of 10 months on account of a tuberculous osteomyelitis of one of the phalanges of the left index finger and a tuberculous submental lymph node. On the fifth, seventh and ninth days after birth, the BCG vaccine had been given by mouth. Pasteurized cow's milk had served as nourishment, and until an attack of pertussis at the age of 7 months the infant had appeared to be in good health. No tubercle bacilli were found in the pus from the suppurating submental lymph node, but three guinea-pigs inoculated at the Pasteur Institute with the same pus all presented marked tuberculous changes at necropsy. The type of tubercle bacillus found in the animal lesions has not yet been determined. There was also a positive skin reaction to tuberculin at the time the infant was first seen by the authors. The father of the infant had been married twice, his first wife dying of pulmonary tuberculosis. The second marriage took place two years later. The mother of the infant was in good health at the time the baby was born, so far as roentgenologic, clinical and bacteriologic examinations were concerned. The father also appeared to be in good health and several examinations including those of the sputum were said to be negative. But, on being subjected to another examination by Weill-Hallé and Mouchotte, although there was no clinical evidence of tuberculosis, roentgenography revealed the presence of a cavity in the right upper lobe, and a large number of tubercle bacilli were found in the sputum. The infant had evidently been temporarily immunized by the BCG vaccine and then infected through inhalation of the dried sputum of the father.

If such a careful examination of the infant's parents had not been made, the BCG vaccine would have been unjustly accused as having given rise to the tuberculosis found in the infant. The authors emphasized the necessity of controlling the vaccination of infants and that of revaccination.

Infant Vaccinated with BCG Infected by Apparently Cured Mother

As a continuation of the discussion of the immunizing value of the BCG vaccine given by mouth to the new-born, Blechmann and Mély reported a case at the April 3 meeting of the Société médicale des hôpitaux of Paris. Two similar cases had been reported by the authors, one in 1930 and a second in 1935. In this third case an infant who had been given the BCG vaccine at birth died at the age of 4½ months of a tuberculous meningitis. Lumbar puncture had revealed a marked lymphocytosis and the presence of tubercle bacilli, verified by Nègre at the Pasteur Institute as being of the human type. The tuberculin skin reaction on the fourth day after the onset of the meningitis symptoms had been markedly positive.

The infant, after having been given the BCG vaccine by mouth immediately after birth, was isolated for the first six weeks but then allowed to be taken care of by the mother. The latter, it was learned on inquiry, had presented signs of a pulmonary tuberculosis about two years before her marriage and had been treated since that time by repeated artificial pneumothorax insufflations. Believing herself cured, the mother

thought that there was no longer any danger of infecting her infant. Blechmann and Mély emphasize the fact that an artificial pneumothorax for pulmonary tuberculosis does not eliminate the possibility of infecting those who live in close proximity of such a patient.

Paraf stated that absorption of the BCG vaccine, administered by mouth, does not always take place. For this reason some vaccinated nurslings are not immunized at all and others do not absorb more than a few bacilli, a quantity insufficient to give rise to the lesions which should serve as a "premunition" against later tuberculous infection. After subcutaneous and, even more so, after oral administration, the BCG vaccine gives only a relative immunity, which is adequate against mild or moderately active infections but is not constant in its ability to combat a severe contamination by a tuberculous father or mother.

It is difficult to state that an individual is no longer a source of infection, after treatment by artificial pneumothorax, even though from a clinical and radiologic standpoint, the patient appears cured. Paraf had often found that the sputum of such patients still contained tubercle bacilli, so that prolonged isolation is indicated. For this reason, in a monograph entitled "Immunity Against Tuberculosis" the author has raised the question as to whether it is worth while to attempt to vaccinate the new-born with the BCG if exposure to severe infection at home is unavoidable. It would appear to be better to vaccinate only older children and adolescents, not yet allergic, thus conferring an immunity which would enable them to resist the less severe infections to which they might be exposed.

Marfan, continuing the discussion, said that as a rule the skin reactions observed in nurslings given the BCG vaccine were either slight or negative; hence the marked reaction in Blechmann and Mély's case showed that the tuberculous infection was of a highly virulent type. The infant should have been kept away from the mother longer than six weeks. The "premunition" or establishment of immunity after administration of the BCG vaccine requires often several months. Vaccinated nurslings should be isolated for a long period from any contact with tuberculous individuals, especially from a parent who has an artificial pneumothorax.

Lesne endorsed Marfan's views and said that nurslings given the BCG vaccine should be kept away from surroundings in which contamination is possible until they are at least 7 months old; otherwise a sense of false security is entertained by the parents.

Lelong stated that at present no test existed which enabled one to state that an infant is immune. The cutaneous reaction and intradermoreaction indicate the presence of infection and not immunity.

Tuberculous (Bovine Type) Meningitis in Infant Vaccinated with BCG

The question as to whether the oral administration of the BCG vaccine is able to immunize nurslings against tuberculosis has been actively and at times acrimoniously debated here during the last two years. Mention has been made of the appointment of a committee by the Pasteur Institute of Paris to hear arguments from both sides. The report of this committee has not yet been published. At the March 27 meeting of the Société médicale des hôpitaux of Paris, two pediatricians of Strasbourg, Rohmer and Vallette, reported the case of an infant born May 16, 1934, which was given the BCG vaccine by mouth without any apparent ill effects. The child had never been nursed by the mother. A revaccination was carried out at the age of 13 months, the infant appearing at that time in excellent condition. During the following two months, symptoms of a mild intestinal nature appeared, accompanied on one occasion by emesis. A short period of slight elevation of temperature was observed about the end of August, and three weeks later the infant appeared to be somnolent, vomited occasionally and suffered from constipation. Examination, September 18, revealed neck rigidity, a positive Kernig sign and apathy. Stains of the fluid obtained by lumbar puncture showed the presence of tubercle bacilli. Guinea-pig inoculation with the cerebrospinal fluid resulted in the discovery of a generalized tuberculosis. The child died September 21, and the necropsy revealed a caseous tuberculosis of the ileum, enlarged mesenteric lymph nodes, a few tubercles in the liver and spleen, and a tuberculous meningo-encephalitis. Pus from the mesenteric nodes was found to contain tubercle bacilli. Some of the pus was inoculated into guinea-pigs. When the latter were killed, lymph nodes containing pus were encountered. This pus studied simultaneously at the bacteriologic laboratory of the University of Strasbourg and at the Pasteur Institute of Paris showed, on inoculation into rabbits, a pure culture of the bovine type of tubercle bacilli. Evidently the atrium of infection in the infant was in the intestine.

The question arises as to the date of the primary infection. The authors quote Wallgren as showing that a tuberculous meningitis, as a general rule, occurs from two to four months after the primary infection; hence Rohmer and Vallette believe that such a primary infection occurred at the time of revaccination (June 15), the symptoms of the meningitis appearing about two months later. Both parents had a history of old, apparently healed tuberculous infection but none of recent character, so this source could be excluded, especially in view of the bovine type of bacilli having been found in the pus of the mesenteric lymph nodes of the infant. Examination of both parents recently also failed to show any tuberculous foci. A source of infection, so far as food was concerned, could also be excluded, according to Rohmer and Vallette. A puzzling feature was the fact that, as verified by Professor Guérin of the Pasteur Institute, Paris, 449 infants had been vaccinated or revaccinated with the same vaccine and that four guinea-pigs inoculated with the vaccine were in perfect condition 213 days later. In the discussion, Guérin said that infants were more frequently infected with tubercle bacilli of the bovine type than is commonly thought, the incidence being at least 10 per cent in France and much higher in the United States and Scandinavian countries, wherefore the instruction to parents never to give an infant unsterilized cow's milk. Guérin believed that the possibility of an infection (with the bovine type) of the parents of this child could not be discarded. The BCG vaccine is of bovine origin, of a strain which originally was very virulent, but during a period of thirteen years, by successive cultures repeated every fifteen days, a stable innocuous strain had been obtained. Even though the milk had been sterilized by the parents of the infant (in Rohmer's case) one could not exclude as a source of infection the cream and butter ingested by the infant.

Weill-Hallé stated that he had employed the same vaccine as was used in Rohmer's case, without observing any accidents.

Tixier questioned the efficacy of the BCG vaccine.

Lesne and Saenz found the bovine type in the cerebrospinal fluid of only seven of 115 cases of tuberculous meningitis.

Marfan believed it unwise to condemn the BCG vaccine from an isolated case such as that reported by Rohmer. The infant had evidently not been immunized, possibly because of nonabsorption of the vaccine. A positive skin reaction in vaccinated infants enables one to determine whether or not the vaccination has been successful.

Two Cases of Bacillus of Pfeiffer Septicemia

Lemierre, Meyer and Laplane reported two cases of septicemia caused by the bacillus of Pfeiffer, March 13, before the Société médicale des hôpitaux of Paris. Blood cultures yielding the bacillus of Pfeiffer have thus far been reported only

during the course of an influenza epidemic accompanied by severe lung complications or in certain bronchopneumonias, measles or pertussis. Lemierre and his associates reported the case of a woman, aged 22, who was taken ill with symptoms of a severe pharyngitis in August 1935, accompanied by high temperatures, chills, fetid breath and the presence of false membranes of a gangrenous aspect. Following an apparent recovery the chills and fever recurred about three months later, with marked joint symptoms. In the middle of October, signs of pulmonary involvement appeared. When first seen by Lemierre at about this period, the patient presented all the general symptoms of a severe septicemia, with some evidences of localization in the right lung and a systolic murmur. Blood cultures at the end of October were positive for the bacillus of Pfeiffer. The patient died about two weeks later but necropsy could not be obtained. The atrium for the endocarditis and generalized infection had evidently been the pharynx. The appearance of the symptoms of septicemia, eleven days after apparent recovery from the pharyngitis, is not an unusual observation. The interesting feature is the absence of the signs of influenzal character at the onset.

The second case was that of a woman, aged 44, who had a severe tonsillitis with sudden symptoms of edema of the glottis, Oct. 22, 1934. Three blood cultures on the third, sixth and eleventh days after admission to Professor Lemierre's service were all positive for the bacillus of Pfeiffer. The pharyngeal symptoms were accompanied by relatively high fever, evidence of multiple joint localization, signs of bilateral pulmonary congestion, anemia, restlessness and emaciation.

Two later blood cultures were negative despite the persistence of the fever. In the second case the atrium had also been in the pharynx but the clinical evidences of a generalized infection appeared almost immediately. An interesting feature of the onset was the presence of such marked edema of the pharynx and larynx that one could suspect, on examination of these structures, an infection due to the bacillus of Pfeiffer. Two similar recent observations were found in the literature, in which the onset of symptoms was marked by the presence of an intense laryngeal dyspnea, so that a diphtheria was at first suspected.

BERLIN

(From Our Regular Correspondent)

April 25, 1936.

The Biologic Effect of Alcohol on Metabolism

The Berlin physiologist Bickel investigated the influence of blood sugar content on the course of the alimentary-alcoholemic curve. Experiments performed on rabbits having normal metabolism demonstrated a dependence of the alcohol content of the blood on the sugar content, since a rich sugar content seems to protect the alcohol from oxidation. The alcohol curve consequently sinks more slowly after ingestion of alcohol and sugar than if alcohol alone has been supplied. From comparative experimentation with insulin it was determined that in subjects with normal blood sugar content the sugar and alcohol curve declined more rapidly subsequent to ingestion of alcohol, and simultaneously a decrease in the blood alcohol took place. If, however, in the same insulin experiment, a substantial quantity of sugar was supplied, the decrease in the alcohol content was no longer evident. The further significant observation was made that the intoxication of the subjects was abbreviated by administration of insulin but was substantially increased if a high blood sugar content was present at the same time. On the other hand, defective utilization of alcohol by diabetic subjects is traceable to the insulin deficiency. In explaining how the insulin effects an abbreviation of the toxic state, Bickel declares it demonstrable that a virtual "blockade produced by insulin" among the ganglion cells opposes the ingested alcohol. The high sugar content appears to retard the entrance of further amounts of alcohol into the tissues.

Of forensic importance is the finding that no quantitative relationship exists between the high level of blood alcohol content and the low level of the intoxication. Individual sensitivity to alcohol must be viewed in the same manner as sensitivities to other agents (tobacco or coffee for example). The value of blood alcohol determined subsequent to an automobile accident, for example, is not alone to be regarded as a satisfactory criterion of drunkenness.

During the discussion of this topic by the Berlin Medical Society, Dr. Wagner, the medical examiner, declared that the utmost caution should govern the interpretation of the blood alcohol content in accident cases. Only values in excess of 2 per thousand can be construed as certain indications of genuine intoxication. Occasionally the curve of alcoholic content in the tolerance test may be an additional important aid. Professor Heubner, pharmacologist, stressed the importance of the type of alcoholic beverage ingested, since the toxic effect may be modified by diverse additional ingredients.

Physical Examinations for Army Service

Universal compulsory military service became reinstated by law in the German reich, March 16, 1935. This necessitated hasty preparations for the examination of the army class immediately scheduled for service and the establishment of a statistical working basis that would facilitate the examination of future classes. The plan, as pointed out by Dr. Müller of the war ministry, was to examine for immediate military service (wehrdienst) all men born in 1914 and to examine all men born in 1915 for the work service (arbeitsdienst), which precedes regular military duty. In addition, 100,000 volunteers were to be inspected. Records of similar service examinations in prewar times, the last of which took place in 1913, provide a certain basis for comparison. The physicians conducting the 1935 examinations, "impressed by the eagerness of the youth to enlist," appear in several instances to have been more lenient in their decisions than the examiners of prewar days.

The principal observations of the 1935 examinations are given in table 1.

Comparison of the 1935 figures with the figures for 1913 gives the results shown in table 2.

Thus, according to these statistics, 83 per cent of those examined were declared fit for active service in 1935 against 76 per cent in 1913. The figures, however, must not be taken to represent any such actual difference in the physical condition of recruits, since the present method of classification differs from the method in use before the war. The examination of recruits in large numbers always provides an excellent opportunity to gain an insight into the physical condition of the nation as a whole. With this in mind the examiners of 1935 took into account in addition to those physical and mental

TABLE 1.—*Results of Examinations for War Service in 1935*

	Percentage of Conscripts	Percentage of Volunteers	Percentage of Both Groups
Fit for service	75.91	86.77	77.02
Fit on condition	6.23	4.21	6.03
Total	82.14	90.98	83.05
Unfit for service:			
Temporarily unfit	6.18	3.65	5.92
Fit for limited service	8.47	4.72	8.08
Unfit for military service (wehrdienst)	2.04	0.53	1.89
Completely unfit	1.17	0.07	1.06
Totals	17.86	8.97	16.95

defects which are deemed important from a military point of view all noteworthy defects and infirmities that could be established by examination. The following figures for 1935 show the percentages of those examined presenting various categories of disease: general debility 7.02, circulatory diseases 7.58, defects of the limbs 19.02, diseases of the ear 3.76, defective ocular refraction 11.31, varices and sequels 5.98, partial or complete flatfoot 23.91, nervous diseases 2.43, crippled and deformed conditions of the vertebral column 16.97, bad teeth 14.86, additional diseases of the eye including blindness 3.05, respiratory diseases 1.51, abdominal hernias 4.86, skin diseases and cicatrices 12.25, chronic bone disease 2.19, chronic digestive disorders 4.77, diseases of the genito-urinary organs 1.57, goiter 4.99, stuttering and mutism 0.75, diseases of the nose, tongue and palate 3.59, general diseases (rheumatism and gout, for example) 0.89, obesity 0.12.

TABLE 2.—*Comparison of 1935 Figures with Those of 1913*

	1913 Percentage	1935 Percentage
Fit	63.6	77.07
Fit on condition	12.4	6.03
Fit for limited service	18.9	8.08
Unfit for military service (wehrdienst)	5.0	1.89
Completely unfit	....	1.06
Temporarily unfit	....	5.92

It will be seen that pedal defects occupy first place. The number of men with defective ocular refraction also appears excessively high.

Prof. Joseph Jadassohn Dead

The dermatologist Prof. Joseph Jadassohn died March 25 in his seventy-third year at Zurich, where he had been living in retirement. A pupil of the dermatologist Neisser, Jadassohn at an early age was appointed director of the University dermatologic clinic at Bern, Switzerland. While occupying this post he led the exceedingly active life of a successful scientist and practitioner. He remained at Bern from 1896 to 1917 and then came to Breslau in his home province as ordinarius. Thereafter, although enticing offers beckoned to him from other regions, he remained loyal to his Silesia. In 1931 he retired. The foregoing are but a few of the important dates in the chronology of a busy and fruitful life. Few representatives of his field of specialization have exercised a direct influence on the development of the dermatologic anschauung comparable to that of Jadassohn. With great modesty he toiled constantly for what seemed to him the important thing. One of Jadassohn's most illustrious pupils, the late Professor Bloch, once paid his master an appropriate tribute: "Jadassohn," he said, "is one of those rare persons who, in their scientific publications, actually never make a mistake." Everything Jadassohn wrote bears evidences of having been precisely weighed, maturely considered and thoroughly elaborated. Thanks to his brilliant powers of observation and his stupendous memory, Jadassohn was able to unite the ideology and trends of the Viennese and French schools and those of the aspiring German dermatologists in a happy synthesis. For nearly four decades he directed the work of the German Dermatologic Society and he knew how to make the international conventions of skin specialists interesting gatherings. He acted as German representative on the Committee on Hygiene of the League of Nations. His work principally concerned eczema, skin diseases due to fungi, dermal tuberculosis, leprosy and the venereal diseases. Jadassohn was also known for the publication of the "Manual of Dermal and Venereal Diseases."

In recent years he had written a textbook of dermatology which to date has not appeared in print, since, after the political upheaval in Germany, Jadassohn was unable to find a publisher. Departing from professional tradition, the German medical publications have either omitted obituaries of this celebrated research scholar and clinician or have accorded him only a few lines.

VIENNA

(From Our Regular Correspondent)

April 27, 1936.

Freedom of Choice of Physician and Sickness Insurance

With the beginning of the new year the so-called Cooperative Union of Employees' Sick Insurance Societies took up its duties. The new social insurance law stipulates that this corporation shall provide for the three groups of employees' insurance organizations included within it (the commercial, industrial and the financial) the following types of joint service: (1) medical attention, obstetric assistance, dental (including mechanical dental) care, furnishing of therapeutic substances and appliances, (2) arrangement for treatment and nursing in various institutions, (3) settlement of accounts with such institutions as well as with physicians, apothecaries and dispensers of medicaments and appliances, and (4) general supervision of the sick. It will be seen that the Cooperative Union has assumed heavy responsibilities, not one of which is more important than the assurance of medical attention. To facilitate the functioning of this service and place the care of the insured on a firmer basis, provisional agreements were arrived at between the union and the organized medical profession. Payments according to individual professional services were decided on and the lump payment system forthwith abolished. The total cost of physicians' services must now be held to a certain percentage of the total receipts of the three societies. This new arrangement carries with it an advantage to the insured; he may now choose his personal physician from among 258 general practitioners and 114 specialists. The old postulate of "free selection of one's physician" has thus been in great measure realized. An insured person who changes his insurance organization or his position may now retain his vertrauenarzt (supervisory medical consultant). Dental needs are the responsibility of the two classes of dentists—practitioners and mechanical dentists. Members of the societies may receive the services of ninety-two of these dentists free of charge. Nominal fees, however, are charged by 244 dentists for the performance of specific work. This new "choose your doctor" system also applies to members of the family of the insured. The patient pays a certain amount to his physician, who then receives the balance directly from the insurance society. Of particular advantage to the doctors are the considerable accumulations of insurance funds now available for every few physicians. From these treasuries the individual doctor receives compensation commensurate with his capabilities. It is now possible for a greater number of physicians to profit from the insurance practice than under the previous lump payment or uniform profits system, which subjected members of the medical profession to something of an economic strain.

At the same time, new regulations were made for the Cooperative Union of Workers' Sick Insurance Societies. The arrangements differ widely from those obtaining in the employees' union. Since the several classes of insured workers pay their premiums into the fund at a lower per capita rate, the number of active physicians cannot be so great or the remuneration so ample as in the employees' insurance. A localizing plan was worked out whereby the exact number of physicians available to the insured workers of each district was determined. Unfortunately, a section of the medical profession under this plan is unable to obtain any insurance patients. It is hoped that in future the work may be so distributed that one physician may confine his activities to

one type of insurance, be it workers', employees', state or municipal. This plan is intended to assure each physician of an income, modest though it may be. Physicians' fees in the workers' insurance have, as in the employees' insurance, been made to conform to a fixed percentage of the corresponding contribution paid in by the insured. According to ordinary calculations some 25 to 30 per cent of the societies' gross income is set aside for the payment of physicians. This means that the doctor receives for single professional services something like 1.20 schillings (25 cents) in the workers' insurance and about 1.60 schillings (32 cents) in the employees' insurance. Specialists receive about double the foregoing amounts. To bring about cooperation between the medical profession and the cooperative union, a "medical commission" has been organized, the membership of which is composed 50 per cent of physicians and 50 per cent of representatives of insurance organizations. Each year the honorarium scale will be computed anew and made to conform to the cash balance at the societies' disposal. Such a system renders the physicians' income rather precarious. The medical commission, in addition to its control of the distribution of physicians' assignments, exercises a much needed power to curtail disbursements for medicaments, cash benefits and hospital care, since such expenditures must come out of that 30 per cent of the gross income set aside for the compensation of physicians. The question of outpatients, heretofore an annoyance to the paid specialist practice, has also been settled. Dental outpatients, together with eye, ear, nose and throat outpatients, are now free to receive treatment from the doctor of their choice and this enables the specialist to carry on an independent practice with steady if modest returns. Since the members of an insured family now are to receive more benefits (this involves some 75,000 persons) a proportionately greater number of physicians will now be called on to serve. These regulations are not to be considered as permanent but as attempts to evolve a system that works. It will require one or two years' time before a condition satisfactory to all can be brought about. Meanwhile one thing is already certain: the incomes of individual physicians will, on the whole, decline and many doctors will find only scant opportunity to carry on private practice.

It is hoped that political and religious factors will not exert too great an influence on the operation of the "localizing plan for physicians."

Death of Professor Bárány

The renowned otologist Prof. Dr. Robert Bárány, first Austrian to obtain the Nobel Prize for Medicine (in 1914), died in Uppsala, Sweden, his second home, a few days short of his sixtieth birthday. Born at Vienna, Bárány began his studies there and took the degree of Universal Doctor of Medicine (M.D.). He studied at Frankfort and at Freiburg, and in 1903 returned to Vienna, becoming active first in the surgical clinic and later in the ear clinic of Professor Politzer, then a Mekka for otologists. As early as 1906, Bárány became known to the medical world through the published results of his investigations on nystagmus caused by labyrinthine disturbance in ear disease among normal-hearing persons and in deaf mutism. Not long after he made the discovery of caloric nystagmus and invented the "caloric test," which came to be one of the most important methods of otologic examination. This test together with others discovered by him (Bárány's past-pointing test, Bárány's symptom complex), developed into a whole series of fundamental aids in the localization of cerebral and cerebellar tumors and abscesses as well as of vestibular disturbances. Bárány, more than any other, contributed to our knowledge of the physiology of the semicircular canals. His discoveries, however, were not appreciated in Vienna at the time and he even had to contend with opposition. So, when invited by the University of Uppsala to assume charge of the ear clinic there, he gladly accepted. At the beginning of the World War he was taken prisoner on the eastern front and it was during his captivity that he was declared a winner of the Nobel Prize for Medicine. The Russians had the generosity (the more striking in view of Bárány's Jewish origin) to allow the eminent scientist immediate freedom so that he might receive the award in person at Stockholm. The honor thus bestowed served to strengthen the ties that bound him to Sweden. In 1917 he became director of the Uppsala clinic. Although in 1909 he had become a docent in Vienna, he first attained professorial rank at Uppsala. Vienna obviously had not considered him worthy of a professorship. In addition to numerous treatises on the labyrinth, written from the standpoints of the physiologist, the surgeon and the sociologist, Bárány was also active as a pacifist and philanthropist. He never allowed his affection for Vienna to wane. This was demonstrated when, thanks to his efforts, the distress among the Viennese physicians after the war was materially alleviated. The Austrian Otologic Society in its most recent session, which took the form of a Bárány memorial meeting, evinced a just appreciation of this man's contributions to medical science.

JAPAN

(From Our Regular Correspondent)

April 15, 1936.

Mortality in Tokyo

According to the report of the Metropolitan Police Board, the deaths within its jurisdiction (excluding only the islands), have been as follows:

Year	Population	Deaths	Rate per 10,000
1931	5,461,628	88,237	161.56
1932	5,735,886	80,956	141.14
1933	5,877,377	89,370	152.06
1934	6,070,880	87,269	143.75
1935	6,287,030	85,230	135.56

On an average, from 222 to 247 deaths occur every day, but the general tendency is to decrease in number. In 1936 the deaths included 45,509 males and 39,721 females. The number of deaths of children under 5 years of age was 27,965 (32.51 per cent). The death rate is high in winter and spring, being highest in January; next comes February, December, March and April. Tuberculosis of the lungs was first with 9,876; other tuberculous cases numbered 3,340, a total of 15.50 per cent. Next come 8,121 deaths from pneumonia (9.53 per cent), then 7,922 cases of cerebral hemorrhage. There were 3,688 deaths from cancer, 3,377 from circulatory disorders and 3,048 from kidney diseases. Suicides by means of poison number 538 and by hanging 300. These numbers included 561 men and 342 women.

Stray Dogs and Rabies

The authorities have decided to prevent rabies. The hunting of homeless dogs has been loudly censured because of its cruelty, but it had to be done to prevent rabies. Since last year the police tried to castrate homeless male dogs instead of killing them. The Association of Veterinary Surgeons has agreed to aid the police board in the treatment of female dogs. The expense is hereafter to be paid equally by an owner, a surgeon and the board. It is expected that within the year more than 1,000 dogs will be castrated. It is estimated that there are over 50,000 dogs in Tokyo.

School Nurses

A remarkable improvement in school hygiene is indicated by an increase of school nurses and school dentists attached to various kinds of schools. This system has been established recently. Of 127 cities, 109 have school nurses in their schools. Formerly it was considered impossible for school teachers to practice the school hygienic laws, because of lack of medical knowledge. In 1934 there were 3,092 nurses throughout the country, an increase of 694 nurses compared with the previous

year. Of these, 806 are graduates from girls' high schools, 2,764 are licensed nurses and 104 are school teachers. The urgent demand for them required the establishment of training institutes with comparatively short training courses lasting for a year here and half a year there and some courses for three months. The course is divided into school hygienics, nursing, bandage dressing, first aid treatment, disinfection, pharmacy, medical instruments, bacteriology, parasitology, dietetics, dentistry, ophthalmology and school hygienic laws. The Education Office is going to organize a central organ to develop school nursing.

The Smoke Nuisance

The cloud of black smoke that shoots into the air night and day from 8,924 chimneys in Tokyo has long been a matter of investigation. A regulation controlling the density of smoke is soon to be issued. Last year the cases exceeding the density limit amounted to 1,560, a decrease of 330 cases as compared with other years on an average.

Memorial Service to Professor Mendel

Memorial services for the late Prof. Lafayette Benedict Mendel were held in the hall of the Dietetic Laboratory in Tokyo March 24 with Dr. Saeki, the chief of the institute, in the chair. After the opening address by the chairman, Prof. Shigenobu Kuriyama of the Tokyo Imperial University paid an eloquent tribute, recalling his first visit to Yale University in 1916, where he studied under Professor Mendel for a year and a half. He said that his English was poor, which was the cause of much inconvenience, but that Professor Mendel treated him with great consideration. He showed some photographs taken in New Haven. Dr. Takeo Inoue of St. Luke's Hospital, who was under his guidance in 1922, highly admired the noble character of Dr. Mendel. After an address by Dr. Koichi Sugimoto of the laboratory, Dr. Saeki spoke impressively. He recalled that he saw Dr. Mendel for the first time in 1905 at Yale University and that he was the oldest of Mendel's followers living here. He praised Mendel's love for his mother, whom he used to go back home to visit whenever he had any time to spare. He said that he had three ambitions: to write the best book on nutrition, to invite Dr. Mendel to Japan, and to devote his life to science. He greatly regretted that he had failed to accomplish the second. Last of all, as a friend of the deceased, Dr. Kanichi Miyajima delivered the closing address. As Dr. Mendel has so many prominent medical scholars in Japan as his followers, his death is still much lamented here.

Death of Prof. Dr. Okajima

Prof. Dr. Keiji Okajima, founder of the anatomy department of the Keio Medical University, Tokyo, suddenly died of apoplexy, April 9, aged 55. He graduated from the Kanazawa Medical College in 1902 and served in the Russo-Japanese War as an army surgeon. After the war he was appointed an assistant in the Tokyo Imperial University and then went to the Kyoto Imperial University and the Nagasaki Medical College as professor of anatomy. When the Keio Medical College was opened he was invited to be chief of its anatomic department. During those thirty years of professorship he devoted his life wholly to the work of anatomy. "The Japanese Anatomy" won fame, for it was entirely written by himself. His later years were given to completing "The Japanese Literature on Anatomy," but his sudden death left it half done. He also painted in oil. According to his will, his bones will be kept in the anatomic department as a specimen.

Death of Prof. Dr. Takahashi

Dr. Gonzaburo Takahashi of the Manchurian Railway Hospital died, April 9, in the hospital at Shinking. He was famous for his discovery in 1933 of the cause of Manchurian typhoid, but he was a victim of this disease.

Marriages

JAMES HAROLD FORRESTER to Miss Jane Eleanor Parker, both of Belleville, Ont., Canada, in New York, May 16.

ROYALE H. FOWLER, Glen Ridge, N. J., to Miss Lillie Marshall Fowler of Montclair, May 9.

JAMES CARR EAGLE, Spencer, N. C., to Miss Sadie M. Ellenburg of Salisbury, May 16.

LEE O. GREENE, Pea Ridge, Ark., to Miss Emma Howard of Cassville, Mo., recently.

ELMER CHARLES KOCOVSKY to Miss Frances Schopen, both of Milwaukee, April 25.

Deaths

Edgar Holden Jr. ⊕ Newark, N. J.; College of Physicians and Surgeons, Medical Department of Columbia College, New York, 1899; member of the American Academy of Orthopedic Surgeons; fellow of the American College of Surgeons; attending orthopedic surgeon to the Newark City, Newark Memorial and Babies' hospitals, and Hospital for Crippled Children; adjunct, St. James and Beth Israel hospitals; consulting orthopedic surgeon to the Hospital of St. Barnabas, Presbyterian Hospital, Hospital for Women and Children, Newark Eye and Ear Infirmary, Newark, Essex County Hospital, Belleville, Mountainside Hospital, Montclair, Muhlenberg Hospital, Plainfield, Irvington (N. J.) General Hospital, Hospital and Home for Incurables, Parental Home and Juvenile Court, Newark Board of Education and the crippled schools, and the Veterans' Administration Facility, Lyons; aged 62; died, April 30, of carcinoma of the lung.

Augustus Washington Knox, Raleigh, N. C.; Bellevue Hospital Medical College, New York, 1874; member of the Medical Society of the State of North Carolina; fellow of the American College of Surgeons; at one time professor of surgery, Leonard Medical School and the University of North Carolina School of Medicine; visiting surgeon to the Leonard and St. Agnes hospitals and consulting surgeon to the Rex Hospital and Norfolk-Southern Railroad; aged 87; died, May 9.

Dwight Wallace Tracy, West Hartford, Conn.; Johns Hopkins University School of Medicine, Baltimore, 1908; member of the Connecticut State Medical Society; for eleven years medical inspector of the city board of health; for many years on the staffs of the Hartford and Hartford Municipal hospitals, Litchfield County Hospital, Winsted, Middlesex Hospital, Middletown, and the Charlotte Hungerford Hospital, Torrington; aged 52; died, March 22, of arteriosclerosis.

Theodore William Schaefer, Kansas City, Mo.; University of Maryland School of Medicine, Baltimore, 1880; professor of analytical chemistry at the University Medical College, Kansas City, 1896-1900, during which time he also taught Latin in the Woman's Medical College, Kansas City; professor of analytical chemistry in the Kansas City Veterinary College, 1900-1906; aged 76; died, March 8, of pneumonia.

Foster Matthew Johns ⊕ New Orleans; Tulane University of Louisiana Medical Department, New Orleans, 1912; assistant professor of clinical medicine at his alma mater; president of the American Society of Clinical Pathologists; vice president of the Orleans Parish Medical Society; co-author of "Practical Clinical Laboratory Diagnosis"; aged 46; died, April 30, of cerebral hemorrhage.

Frank Clarendon Cook ⊕ Medical Director, Captain, U. S. Navy, retired, Philadelphia; Harvard University Medical School, Boston, 1893; entered the navy in 1894 and retired in 1933 on attaining age of 64 years; served during the Spanish-American and World wars; aged 66; died, April 20, in the United States Naval Hospital, of intestinal obstruction and chronic myocarditis.

Benjamin Brittain Simms, Talladega, Ala.; Jefferson Medical College of Philadelphia, 1885; member, past president and secretary of the Medical Association of the State of Alabama; past president of the Talladega County Medical Society; at one time county health officer and member of the city council; formerly on the staff of the Citizens' Hospital; aged 76; died, March 25, of uremia.

James Monroe Austin, Columbia, S. C.; Medical College of the State of South Carolina, Charleston, 1930; member of the South Carolina Medical Association and the American Psy-

chiatric Association; served during the World War; on the staff of the South Carolina State Hospital; aged 38; died, April 24, of arterial hypertension and chronic nephritis.

John Samuel Maeder, New York; New York Homeopathic Medical College and Flower Hospital, New York, 1908; assistant professor of urology at his alma mater; served during the World War; on the staffs of the Metropolitan and Fifth Avenue and Flower hospitals; aged 54; died, April 14, in Mount Vernon, N. Y., of chronic endocarditis and tonsillitis.

John Joseph Bona, Chicago; Chicago College of Medicine and Surgery, 1915; member of the Illinois State Medical Society; fellow of the American College of Surgeons; clinical instructor in surgery, Loyola University School of Medicine; aged 43; on the staff of the Hospital of St. Anthony de Padua, where he died, April 25, of pneumonia.

Read McLane Ellsworth, Baltimore; Johns Hopkins University School of Medicine, Baltimore, 1924; member of the American Society for Clinical Investigation; associate in medicine at his alma mater; assistant physician on the medical staff of the Johns Hopkins Hospital and Dispensary; aged 37; died, April 28, of pulmonary tuberculosis.

John Henry Seiler, Akron, Ohio; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1886; past president of the Summit County Medical Society; formerly member of the board of education; for many years on the staff of the City Hospital; aged 78; died, March 31, in Southern Pines, N. C., of arteriosclerosis.

George August Hopp, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1910; member of the Medical Society of the State of Pennsylvania; formerly associate professor of pathology at his alma mater; member of the American Society of Clinical Pathologists; aged 53; died, April 27, of myocarditis.

Thomas Jackson Russell, Somerville, Ala.; University of Alabama Medical Department, Mobile, 1904; member of the Medical Association of the State of Alabama; past president of the Morgan County Medical Society; formerly member of the county board of health; aged 65; died, March 26, of chronic nephritis and uremia.

Jacob D. Updegrove ✠ Phillipsburg, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1890; member of the Medical Society of the State of Pennsylvania; at one time lecturer of hygiene and director of physical training, Lafayette College, Easton, Pa.; aged 73; died, March 22, of arteriosclerosis.

Thomas Francis Mullen, Detroit; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1908; member of the Michigan State Medical Society; fellow of the American College of Surgeons; aged 52; junior orthopedic surgeon, outpatient department, Harper Hospital, where he died, April 13.

Harold James Connor ✠ Concord, N. H.; Tufts College Medical School, Boston, 1913; member of the New England Roentgen Ray Society; served during the World War; on the staffs of the Margaret Pillsbury and New Hampshire Memorial hospitals; aged 45; died, April 8, of cerebral hemorrhage and nephrosis.

Horace Westlake Frink ✠ Chapel Hill, N. C.; Cornell University Medical College, New York, 1905; member of the American Psychoanalytical Association; formerly assistant professor of clinical medicine at his alma mater; aged 53; died, April 18, in the Pine Bluff (N. C.) Sanitarium, of heart disease.

James Abram Womack, Equality, Ill.; University of Tennessee Medical Department, Nashville, 1884; member of the Medical Association of the State of Alabama; past president of the Gallatin County Medical Society; formerly state senator; aged 75; died, March 30, of carcinoma of the prostate.

James Albert Williams, Belle Plaine, Iowa; Bennett College of Eclectic Medicine and Surgery, Chicago, 1895; member of the Iowa State Medical Society; formerly member of the city council and board of education; aged 70; died, March 26, in the University Hospital, Iowa City, of pneumonia.

John Chauncey Van Nuys, Lufkin, Texas; Rush Medical College, Chicago, 1897; member of the State Medical Association of Texas; formerly president and secretary of the Angelina County Medical Society; on the staff of the Angelina County Hospital; aged 67; died, March 12, of pneumonia.

Wilgus Bach ✠ Jackson, Ky.; University of Louisville Medical Department, 1910; fellow of the American College of Surgeons; past president of the Breathitt County Medical Society; owner and medical director of a hospital bearing his name, aged 49; died, April 28, of pneumonia.

Dawson Dwight Van Osdol, Rushville, Ind.; Miami Medical College, Cincinnati, 1894; member of the Indiana State Medical Association; past president of the Rush County Medical Society; on the staff of the City Hospital; aged 66; died, March 24, of cerebral hemorrhage.

Thomas Chittenden Hill ✠ Boston; University of Vermont College of Medicine, Burlington, 1895; fellow of the American College of Surgeons; consultant to the department of rectal diseases, Boston Dispensary; aged 65; died, April 11, in Vero Beach, Fla., of heart disease.

Frank Bradbury Hollenbeck ✠ Lincoln, Neb.; Rush Medical College, Chicago, 1898; fellow of the American College of Surgeons; past president of the Lancaster County Medical Society; surgeon to St. Elizabeth's Hospital; aged 67; died, April 12, of coronary thrombosis.

Robert Harrison Jeffrey ✠ Uniontown, Pa.; Jefferson Medical College of Philadelphia, 1912; served during the World War; fellow of the American College of Surgeons; aged 47; on the staff of the Uniontown Hospital, where he died, April 23, of subarachnoid hemorrhage.

Walter Clifford Chidester ✠ San Mateo, Calif.; Medical College of Ohio, Cincinnati, 1896; member of the Pacific Coast Surgical Association; fellow of the American College of Surgeons; aged 60; medical director of the Mills Memorial Hospital, where he died, April 21.

Robert Borden Smiley, Tripoli, Wis.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1902; served during the World War; aged 58; died, March 28, in the Wisconsin General Hospital, Madison, of coronary sclerosis.

Edward W. Steeves, Brownsville, Pa.; College of Physicians and Surgeons, Baltimore, 1898; member of the Medical Society of the State of Pennsylvania; on the staff of the Brownsville General Hospital; aged 68; died, March 24, of angina pectoris.

James Meriweather Hull, Augusta, Ga.; University of Georgia Medical Department, Augusta, 1879; member of the Medical Association of Georgia; professor emeritus of clinical ophthalmology and otolaryngology at his alma mater; aged 77; died, April 13.

Jacob A. Walter ✠ Punxsutawney, Pa.; Hahnemann Medical College and Hospital of Philadelphia, 1887; formerly on the staff of the Adrian Hospital; aged 76; died, March 30, in the Hahnemann Hospital, Philadelphia, of carcinoma of the stomach.

John Franklin Snyder ✠ Pittsburgh; University of Pittsburgh School of Medicine, 1931; assistant resident physician to the Municipal Hospital for Contagious Diseases; aged 29; died, March 22, of general peritonitis and cerebral hemorrhage.

Fred William Robinson, Sturgis, Mich.; Detroit College of Medicine, 1893; member of the Michigan State Medical Society; aged 68; formerly on the staff of the Sturgis Memorial Hospital, where he died, March 20, of carcinoma of the prostate.

James Robert Tyner, Murfreesboro, Tenn.; Washington University School of Medicine, St. Louis, 1934; member of the Medical Association of Georgia; resident physician at the Rutherford Hospital; aged 29; died, March 10, of scarlet fever.

Daniel John Townsend, Lohrville, Iowa; Drake University Medical Department, Des Moines, 1887; member of the Iowa State Medical Society; formerly member of the state legislature; aged 80; died, March 27, of heart disease.

Baylis Frank Sloan, Walhalla, S. C.; Medical College of the State of South Carolina, Charleston, 1900; member of the South Carolina Medical Association; served during the World War; aged 57; died, March 23, of coronary occlusion.

William Shaftner Yates ✠ Junction City, Kan.; Kansas City (Mo.) Medical College, 1893; county health officer; formerly on the staff of the Junction City Municipal Hospital; aged 71; died, March 29, of carcinoma of the larynx.

Grover Cleveland Davis, Pelahatchee, Miss.; Memphis (Tenn.) Hospital Medical College, 1912; served during the World War; aged 47; died, March 19, in a hospital at Memphis, Tenn., of pellagra and tuberculosis of the lungs.

Frank M. Wiley ✠ Fredonia, Kan.; Starling Medical College, Columbus, 1877; past president of the Wilson County Medical Society; for many years county coroner; aged 80; died, March 12, of cerebral arteriosclerosis.

William Beatty Lunn ✠ Marquette, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1897; on the staffs of St. Luke's and St. Mary's hospitals; aged 63; died, March 28, of heart disease.

Josiah Lane Sanborn, Bayonne, N. J.; University of the City of New York Medical Department, 1885; on the staff of the Bayonne Hospital and Dispensary; aged 72; died, March 27, of diabetes mellitus and influenza.

Robinson Herman Salmon, Mertens, Texas; Medical College of Alabama, Mobile, 1893; member of the State Medical Association of Texas; aged 64; died, March 28, in the Boyd Sanitarium, Hillsboro, of pneumonia.

Guy Addison Smith, Kansas City, Kan.; Fort Wayne (Ind.) College of Medicine, 1905; member of the Kansas Medical Society; aged 53; died, March 17, in the Bethany Methodist Hospital, of chronic myocarditis.

George Walters Beane, McKees Rocks, Pa.; Bellevue Hospital Medical College, New York, 1883; member of the Medical Society of the State of Pennsylvania; aged 74; died, March 5, in Lake Worth, Fla.

Harris E. Timerman, Chicago; Rush Medical College, Chicago, 1900; member of the Illinois State Medical Society; on the staff of the Swedish Covenant Hospital; aged 59; hanged himself, March 25.

Francis Henry Davenport, Boston; Harvard University Medical School, Boston, 1874; member of the Massachusetts Medical Society; fellow of the American College of Surgeons; aged 84; died, April 9.

Lawrence Madison Small, Ionia, Iowa; Marion-Sims College of Medicine, St. Louis, 1897; aged 69; died, March 20, of hemiplegia due to cerebral hemorrhage, arteriosclerosis and bronchopneumonia.

Edgar F. Taylor, Clinton, S. C.; Medical College of the State of South Carolina, Charleston, 1876; member of the South Carolina Medical Association; aged 83; died, March 27, of bronchopneumonia.

Howard Franklin Smith, Hartford, Conn.; Yale University School of Medicine, New Haven, 1896; formerly police surgeon; aged 63; died, March 23, in the Mount Sinai Hospital, of coronary occlusion.

James Z. Henry, Ellenwood, Ga.; Atlanta School of Medicine, 1909; member of the Medical Association of Georgia; aged 53; died, March 20, in the Crawford W. Long Memorial Hospital, Atlanta.

Rawley Martin Shelton, Unionville, Va.; University of Virginia Department of Medicine, Charlottesville, 1897; member of the Medical Society of Virginia; aged 65; died, March 15, of pneumonia.

Clark Abbott Stuart, Castorland, N. Y.; Baltimore Medical College, 1890; member of the Medical Society of the State of New York; health officer of Castorland; aged 68; died, March 15, of erysipelas.

William Edward Diller, New York; University of Virginia Department of Medicine, Charlottesville, 1884; University of the City of New York Medical Department, 1885; aged 77; died, March 23.

Edwin Oscar Swanson ✠ St. Paul; University of Minnesota Medical School, Minneapolis, 1917; served during the World War; aged 45; died, March 29, of influenza, encephalitis and pneumonia.

Casius Clay Surber, Independence, Kan.; Kansas City (Mo.) Medical College, 1884; for twenty-five years chief of staff of Mercy Hospital; aged 75; died, March 8, of mitral regurgitation.

Willis Edward Lingle ✠ Cobden, Ill.; St. Louis College of Physicians and Surgeons, 1894; past president of the Union County Medical Society; aged 63; died, March 27, of coronary thrombosis.

John Henry Phillips ✠ Willis, Texas; University of Texas School of Medicine, Galveston, 1913; served during the World War; aged 67; was killed, March 11, by an automobile in Houston.

Edward Buckminster Stephens, Plymouth, Mass.; Jefferson Medical College of Philadelphia, 1883; aged 85; died, March 24, in Andover, of chronic myocarditis and senile dementia.

Edgar Speiden, Silver Spring, Md.; George Washington University School of Medicine, Washington, D. C., 1905; aged 69; died, March 15, of cerebral hemorrhage and cardiac hypertrophy.

Charles Clyde Tidd, Mineral Ridge, Ohio; Western Reserve University Medical Department, Cleveland, 1899; veteran of the Spanish-American War; aged 60; died, March 14.

Claudius Junius Young, Washington, D. C.; Howard University College of Medicine, Washington, 1915; aged 55; died, March 21, of incised wounds of neck and wrist, self-inflicted.

Samuel Herbert Stephens, Saylesville, R. I. (licensed by Rhode Island State Board of Health under the Act of 1895); aged 78; died, March 28, of arteriosclerosis and myocarditis.

Harry Lincoln Finley, Taxila, Punjab, India; Jefferson Medical College of Philadelphia, 1895; aged 71; died, March 12, of pneumonia and malignancy of the prostate.

John T. Hunter, Equality, Ala.; Birmingham Medical College, 1901; member of the Medical Association of the State of Alabama; aged 71; died, March 22, in Wetumpka.

Adeline Goodrich Soule, Kansas City, Mo.; Hahnemann Medical College and Hospital, Chicago, 1890; aged 82; died, March 29, in a hospital at St. Joseph, of senility.

Ralph Martin Tidd ✠ Clark, Pa.; Rush Medical College, Chicago, 1902; president of the Mercer County Medical Society; aged 59; died, March 11, of angina pectoris.

Smith James Townsend, Gilmore City, Iowa; Western Reserve University Medical Department, Cleveland, 1892; aged 67; died, March 5, of uremia and pyelitis.

Felix Jefferson Willey ✠ Mer Rouge, La.; Vanderbilt University School of Medicine, Nashville, Tenn., 1914; aged 45; died, March 26, in Little Rock, Ark.

Frank Allison Brown, Stockton, Mo.; Barnes Medical College, St. Louis, 1903; member of the Missouri State Medical Association; aged 56; died, March 13.

Joseph Milton Wine, Dayton, Ohio; Chicago Homeopathic Medical College, 1890; member of the Ohio State Medical Association; aged 70; died, March 20.

Lina M. Rosat, Lincoln, Neb.; Homeopathic Medical College of Missouri, St. Louis, 1891; aged 72; died, March 17, of myocarditis and hypostatic pneumonia.

James Arthur Matthews, Mathis, Texas; University of Louisiana Medical Department, New Orleans, 1873; aged 89; died, March 14, of coronary occlusion.

Hudson D. Rice, Dallas, Texas (registered by Texas State Board of Medical Examiners, under the Act of 1907); also a druggist; aged 80; died, March 25.

John M. St. Clair, Indiana, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1875; aged 88; died, March 29, of arteriosclerosis.

Myles Jasper Slaughter, Millerville, Ala.; University of Alabama Medical Department, Mobile, 1905; aged 65; died, March 19, of pneumonia.

Francis Marion Trigg, Freeport, Kan.; College of Physicians and Surgeons, Keokuk, Iowa, 1886; aged 75; died, March 13, of erysipelas.

Thomas Jefferson Randall, Los Angeles; University Medical College of Kansas City, Mo., 1899; aged 75; died, March 24, of arteriosclerosis.

James Semple, Kisbey, Sask., Canada; Trinity Medical College, Toronto, Ont., 1894; aged 67; died suddenly, March 17, of angina pectoris.

A. Bromley York, Huntington, W. Va.; University of Cincinnati College of Medicine, 1924; aged 36; died, March 20, of embolism.

Thomas Coolidge, Coalinga, Calif.; Barnes Medical College, St. Louis, 1896; aged 74; died, March 24, of coronary thrombosis.

George Heinrich Braun, Fort Smith, Ark.; Eclectic Medical College of the City of New York, 1887; aged 73; died, March 12.

P. L. Collinsworth, Atlanta, Ga.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1897; aged 63; died, March 17.

Edward Tomlinson ✠ Orono, Maine; Trinity Medical College, Toronto, Ont., Canada, 1893; aged 66; died, March 24.

Robert Wilson Claypool, Mellott, Ind.; Rush Medical College, Chicago, 1881; aged 78; died, March 30.

John Nelson Stone, Newark, Ohio; Starling Medical College, Columbus, 1892; aged 67; died, March 17.

Edward A. Jeffers, Chuckey, Tenn.; Chattanooga Medical College, 1907; aged 53; died, March 16.

Byron C. Sorrels, Mansfield, Ark. (licensed in Arkansas in 1903); aged 70; died, February 24.

Ransom B. Lynch, Plato, Mo.; St. Louis Medical College, 1873; aged 90; died, March 8.

Correspondence

REVERSIBLE CARDIAC ENLARGEMENT

To the Editor:—In his article on reversible cardiac enlargement in THE JOURNAL, May 23, Dr. John E. Walker named arteriovenous aneurysm, beriberi and myxedema as the three conditions in which cardiac enlargement may be reduced to normal after specific therapy. To these three I add another. During the past few years we have made extensive studies at the Montefiore Hospital on cardiac enlargement secondary to chronic pulmonary tuberculosis and have observed in several instances the return to normal size, radiographically, of moderately, or greatly enlarged, hearts following the institution of intensive diuretic therapy. In one particular instance a heart which occupied almost the entire chest on x-ray examination was reduced to almost normal size within a month and then went through a similar cycle of enlargement and reduction six months later. Of course, this type of reversible cardiac enlargement is not identical with that described by Dr. Walker because in his cases the reduction in size was accomplished by specific treatment of the etiologic agent, namely, the aneurysm, the beriberi or the myxedema, whereas in our cases treatment was directed only toward the cardiac failure itself and had no bearing on the primary cause of the cardiac enlargement, pulmonary fibrosis secondary to the tuberculous disease. The prognosis in the two types of conditions is entirely different. In Dr. Walker's cases the reduced hearts remain of normal size permanently or as long as the treatment is effective. In the enlarged hearts secondary to pulmonary disease the improvement is only temporary—weeks or months—but eventually the hearts enlarge again and generally speaking the course of illness in these patients is really dependent on the extent and type of the pulmonary disease. In cases of active pulmonary tuberculosis the response to cardiac therapy is insignificant, while in the cases of inactive fibrotic lesions much can be accomplished in the reduction of the cardiac size and the establishment of compensation clinically. The chief point I wish to emphasize, however, is that the cardiac enlargement in pulmonary heart disease, even though extensive, may be reversible with intensive therapy.

MILTON B. ROSENBLATT, M.D., New York.

"GRANULOCYTOPENIA"

To the Editor:—The editorial on "Granulocytopenia, Malignant Neutropenia or Agranulocytosis" published in THE JOURNAL, April 25, fails to mention a number of recent articles which have gone far to elucidate some of the mechanisms involved in production of the disease in question.

Most investigators have now accepted the theory first enunciated by Fitz-Hugh and Krumbhaar that the bone marrow of the disease is characterized by a state of "maturation arrest" of the white cells, in which, although the marrow is well stocked with primitive leukocytes ready to mature, the peripheral blood shows depletion of granulocytes. The most complete of recent publications demonstrating this feature is that of R. C. Darling, Frederic Parker Jr. and Henry Jackson Jr. (*Am. J. Path* **12**:1 [Jan.] 1936). These authors point out from study of their large material (mostly biopsies from sternal bone marrow) that the disorder has a rather consistent pathologic picture, which is chiefly characterized by a profusion of young granulocytic cells, the mature cells being conspicuously reduced in number.

What is the mechanism of this "maturation arrest" and why does it occur? Many authors have pointed out that the blood changes may antedate the clinical manifestations of prostration, high fever and mucous membrane necrosis by several days. Sepsis as a factor either general or derived from a local necrotic process seems therefore very unlikely. As the editorial writer points out, the importance of drugs as etiologic agents has gradually become appreciated in the last few years. Since only a few of the many who have taken aminopyrine or dinitrophenol or arsphenamine develop the disease, the possibility that the disease might be due to an idiosyncrasy, hypersensitivity or allergy to the drug aminopyrine was advanced by several authors. Complete experimental proof of this hypothesis was lacking, however, until publication of an article by William Dameshek and Abraham Colmes (*J. Clin. Investigation* **15**:85 [Jan.] 1936). In this study it was shown that in the last series of twelve consecutive patients studied the only consistent etiologic factor was that of a drug, usually aminopyrine, administered either alone or in combination with a sedative. Eight patients of this series recovered and four were intensively studied from the standpoint of a possible allergic reaction to aminopyrine. These four patients when given aminopyrine by mouth in a dosage of from 5 to 50 grains (0.3 to 3.25 Gm.) reacted in varying degrees. One patient, within two and one-half hours after administration of 10 grains (0.6 Gm.) of the drug, developed malaise, pains in all the joints, nausea, and severe headache. In twenty-four hours she had extreme prostration, headache, fever, and a leukocyte count of 1,400, with 28 per cent polymorphonuclear cells. She then developed complete agranulocytosis and finally necrotic lesions of the buccal mucous membranes. After several anxious days, she made a spontaneous recovery.

Scratch tests, patch tests, intradermal tests and passive transfer tests with aminopyrine in all four patients were negative, but striking skin reactions were obtained when intradermal tests were made with a mixture of aminopyrine solution that had been "aged" with human blood serum for several days (controls all negative). This procedure was carried out after the work of F. L. Horsfall Jr. (*J. Immunology* **27**:553 [Dec.] 1934) on formaldehyde serum proteins and of Landsteiner on "drug-protein linkage" as a basis for the allergic reaction in certain instances. Not only did these striking skin reactions occur, but two of the patients developed severe hematologic and then clinical agranulocytosis, although the amount of aminopyrine introduced intradermally could not have been greater than 10 mg. (one-sixth grain). Both of these phenomena demonstrated beyond question the great hypersensitivity or idiosyncrasy or allergy of the subjects tested to the drug aminopyrine and suggested a drug-protein linkage as the basis of the "allergic" reaction. That agranulocytosis occurred after intradermal injection of minute quantities of aminopyrine would seem to disprove the contentions of R. R. Kracke and F. P. Parker (*Am. J. Clin. Path.* **4**:454 [Nov.] 1934) that "the injection of these drugs, whether it be subcutaneous, intraperitoneal or intravenous, would result in little opportunity for oxidation to the more toxic products, whereas the oral administration of the same drugs . . . would lend them to easy oxidation in the gastro-intestinal tract."

In previous unpublished experiments, Dameshek demonstrated that normal subjects given aminopyrine over a period of from two to four weeks usually developed leukopenia followed by leukocytosis ("release phenomenon") when the drug was discontinued. This suggested that the drug depressed the growth tendency of leukocytes in the bone marrow. Some patients might be so sensitive to the drug that an almost immediate maturation arrest could occur when the drug was given. That this was so was recently nicely demonstrated by Plum (*Ugesk. f. læger*, 1936, p. 91), who gave aminopyrine by mouth to three patients who had recovered from attacks of agranulocytosis and performed puncture biopsies of the sternal bone marrow both before and after administration of the drug. Coincidently with the resultant agranulocytosis in the blood, the bone marrow showed large numbers of very immature cells,

only a few mature cells being present. Plum concluded that the leukopenia was the result of a decrease in the production of granulocytes (again "maturation arrest").

The editorial writer states that the mortality is about 92 per cent. This was the mortality rate in 1932 but appears to have become modified considerably since introduction of the nucleic acid derivatives. Of my last twelve patients, all treated with these preparations, nine recovered. In Jackson's large series, about two thirds recovered. Recovery seems to depend on early diagnosis and immediate and massive therapy. In my own hands, greatest success has been obtained with the use of adenine sulfate—a split product of the pentose nucleotides—given intravenously in a dosage of from 1 to 2 Gm. daily or even more frequently.

All will agree, however, that the best treatment for agranulocytosis is prevention. Fortunately the disease seems to be becoming quite rare and this may be due to lessened consumption of aminopyrine both alone and in various sedative combinations. Be that as it may, the whole problem of hypersensitivity, idiosyncrasy or "allergy" to drugs is still a wide open one and will repay much investigation.

WILLIAM DAMESHEK, M.D., Boston.

HAZARD OF METAL FOIL ON CANDY AND TOBACCO

To the Editor:—Your answer to the letter of inquiry from Dr. Charles Stover (THE JOURNAL, May 2, p. 1590) regarding the hazards of metal foil on chocolate is timely. Probably the hazard from the use of tobacco packed in foil is quite as great. Recently a bookkeeper, aged 60, consulted me, complaining of self-diagnosed gout. The symptoms and signs were pain in both legs, swelling of the base of the right great toe, and deposits suggesting tophi at the base of the great toe and the second toe. Other symptoms were loss of appetite, extreme nervousness, muscle twitching and mild weakness. According to Peters and Van Slyke, lead poisoning has long been recognized as a cause of gout. They cite Magnus-Levy's thirty-six cases of gout, thirteen of the patients having definite lead poisoning and six others presumably having it. With this in mind the patient was questioned closely as to a possible contact with lead. He stated that for fifteen years he has smoked in a pipe one type of tobacco, which is wrapped in a lead tin foil. The tobacco was in actual contact with the foil, sheets of which measure 17.5 by 25 cm. For purposes of economy the patient has made a practice of saving and selling this foil. Recently he had a pile of flat sheets about 15 cm. in thickness. Before disposing of it he brushed the tobacco from each sheet. There were between one and two hundred sheets, each of which was covered with many little flecks of tobacco and coated in spots with a gray, oily substance, the nature of which has not yet been determined. The salvaged tobacco was then added to the general supply and smoked. Two sheets of the foil and the tobacco pouch were obtained for examination.

The physical examination of the patient was not significant beyond the appearances suggesting gout in the right foot. Pertinent laboratory results were blood uric acid 4.5 mg., no lead line demonstrated at the gum margins, few stippled cells noted in the blood smear, and no abnormal porphyrin in the urine. Two twenty-four hour urine specimens examined by the Ross-Lucas method were found to contain 3 mg. and 1 mg. of lead. The normal lead values for a twenty-four hour specimen range between 0.05 and 0.1 mg. During these tests the patient took 15 grains (1 Gm.) of potassium iodide daily.

A spectroscopic examination was made by Clarence Dupont, spectroscopist of the Strong Memorial Hospital, of the foil, the oily substance observed on it, and the tobacco. With each test lines indicating excessive amounts of lead were noted at wavelengths 2,837.32 and 2,833.07 angstroms. A portion of the tobacco taken from the patient's pouch was found to contain 6 mg. of lead per hundred grams, approximately the amount smoked daily. It is estimated by previous investigators that from one fifteenth to one fourth of the lead in tobacco is taken into the body by pipe smoking. This would mean that the patient probably inhaled from 0.4 to 1.5 mg. daily.

The foregoing facts suggest that the patient was definitely poisoned by the lead in the tobacco packed in a foil containing a large amount of lead. The symptoms resulting therefrom presented the clinical picture of gout.

In addition to lead contamination from the foil, there are, in all probability, variable amounts of lead on the tobacco itself caused by the sprays which are used by the growers. Evidence of this fact has been found recently by several investigators. Many of the widely advertised brands of cigarets contain lead in excessive amounts, so that persons employed in an industry or living under circumstances in which they might inhale or ingest small amounts of lead may, by the supplemental lead obtained from the free use of cigarets or smoking tobacco, easily contract low-grade or chronic lead poisoning.

JOHN R. WILLIAMS, M.D., Rochester, N. Y.
388 Monroe Avenue.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

ACUTE OTITIS MEDIA AND SWIMMING

To the Editor:—My son, aged 8 years, last year developed acute otitis media, with spontaneous perforation, from swimming, and the condition completely healed soon after. What measures do you advise to prevent recurrence, if he wants to swim again this year? Please omit name.

M.D., New York.

ANSWER.—In order to prevent a recurrence of acute otitis media due to swimming, it is advisable for the patient not to dive and not to allow water to enter the external auditory canal. The ear may be reinfected in diving by water forcing its way up the eustachian tube. To keep water out of the external auditory canal it is best to block the canal with a piece of sterile lamb's wool and wear a bathing cap. The patient should also be cautioned about blowing his nose violently as swimmers often do in order to free the nasal passages.

PERCUTANEOUS TUBERCULIN TEST AND TAPE TEST

To the Editor:—In Queries and Minor Notes in the tuberculosis number of THE JOURNAL (Dec. 7, 1935) you mention the percutaneous method tuberculin test (described by Beatrice Lovett) and the tape test (described by Ernst Wolff). Will you please give me the technic and source of material for both these tests? Kindly omit name. M.D., Arizona.

ANSWER.—The percutaneous method of administering tuberculin described by Lovett (*Am. J. Dis. Child.* **37**:918 [May] 1929) is a modification of the Moro test. It consists of rubbing the skin over the region of the sternum with ether in order to remove all oil from the pores. This is accomplished when hyperemia appears. To this area is applied a piece of concentrated old tuberculin about the size of a pinhead, which is rubbed into the skin with the fingers. If the test is negative, the skin will appear normal at the usual time of reading the test; that is, in about forty-eight hours. If the test is positive, a definite reaction will be seen at this time to consist of papules scattered about the area but there may be little or no reddening of the skin. A marked reaction, however, consists of folliculitis, with small vesicles or pustules and intense inflammation of the skin. The material employed by Lovett is manufactured and dispensed in collapsible tubes by Dr. Fresenius, Hirsch Apotheke, Frankfort-on-Main. However, other tuberculin ointments are now available for this test.

The tape test of Wolff (*Am. Rev. Tuberc.* **27**:308 [March] 1933) consists of cleansing the skin in the paravertebral region between the eighth and eleventh thoracic vertebrae with green soap and water. When dried, the area is bathed with benzene. After drying again, a drop of tuberculin ointment the size of a pea is applied over the right side of the cleansed area and on the left side a drop of control ointment is used. Both drops are then covered with pieces of adhesive tape two inches square. This is tightly applied. In forty-eight hours the tape is soaked with benzene and removed. Ten minutes later the reaction is observed. When positive, the area over which the tuberculin ointment was applied shows papules, erythema, induration and pigmentation. He finds that this test is generally comparable in results with the intracutaneous test in a dilution of 1 : 100. The ointment used for this test was devised by Wolff of the pediatrics department of the University of California Medical School and was especially prepared for him. It contains a highly concentrated tuberculin and killed tubercle bacilli incorporated in an ointment base that is able to penetrate into the cutis.

TREATMENT OF GONORRHEA

To the Editor:—A male patient contracted gonorrhea in 1912 and after having received injections of silver nitrate, massages and sound treatments for two years was discharged as cured. In 1917 sickness recurred. It might also have been reinfection. He received about the same treatment as before without result, until in 1919 he engaged the services of a university professor, who discharged him as cured after two months of treatment. A year later, in 1920, he again had a discharge, and the general feeling was bad. After a few months of treatment by the same professor, he was discharged again as completely cured and allowed to get married, which he did that same year, and has four healthy children. He felt well until 1932, when symptoms of occasional discharges, mostly mucous, and general bad feeling reappeared. Physical examination revealed a small nodule in the right epididymis. The prostate was normal in size and moderately firm in consistency. The seminal vesicles were somewhat thickened, the right considerably dilated and indurated. Discharges and fluids obtained by prostatic massage were frequently examined and showed numerous pus cells but no gram-negative diplococci. On cystoscopic examination the instrument passed with some difficulty because of a tight posterior urethra. The interureteral bar was large and somewhat enlarged; otherwise the results were normal. A roentgenogram was negative. The patient received a series of treatments consisting of prostatic massage, urethral instillations and bladder irrigations, vaccine and foreign protein injections. The patient appeared to be comfortable for a few weeks, when the symptoms recurred much to his dismay. I would appreciate any suggestion for treatment of this case. Kindly omit my name.

M.D., New York.

ANSWER.—The urethral discharge in 1917, if it was gonorrheal, undoubtedly was a new infection. The probable reasons for continuance of trouble for two years were either the patient's conduct or overtreatment. The professor's ready success was probably due to the fact that he controlled the patient and used either milder or no local treatment. It is probable, however, that the patient was left with an infected prostate, which in 1920 caused a urethral discharge which was not gonorrheal, and the professor, knowing that it was not gonorrheal, had no reason to interdict matrimony.

The clinical picture starting with 1932 is not so clear. There are features suggesting long-standing prostatic infection and, on the other hand, if the clinical observations are correct, it could be due to tuberculosis. The latter is suggested by the nodule in the epididymis, induration of the seminal vesicle and the "tight posterior urethra." If the patient had an attack of epididymitis previously and the nodule in the epididymis is in the lower pole, the epididymal condition is in all probability not of tuberculous origin. If not, and the nodule is in the upper epididymal pole, this disease merits serious consideration. Seminal vesicular palpation is fraught with so many possibilities for error that what seems fibrosis to one is to another merely tissue density normal to the individual. It is rare that tuberculosis of the prostate of sufficient degree to give the impression of tightness on the passage of an instrument does not cause nodulation of the gland. Thus, the first most important thing is to rule out that disease. Otherwise grave harm may be done by forms of treatment appropriate to other diseases.

The repeated attacks of urethral discharge, whether or not gonorrheal, the large amount of pus in the prostatic secretion, "the tight posterior urethra," and the enlarged interureteral bar all bespeak marked prostatic infection. If tuberculosis is ruled out, this probably started as the result either of gonorrhea or of the treatment, though one should not lose sight of oral infections, teeth or tonsils, as possible factors.

So far as treatment is concerned, tuberculosis being ruled out, it is probable that no amount of prostatic treatment will render such a gland pus free. Much, however, may be done for the prevention of possible arthritic or other focal infective conditions by occasional digital drainage of the gland by rectum. Such patients frequently are candidates for median bar formation and should be observed from year to year with that in mind.

The age of the patient is not mentioned but, so far as the nongonorrheal discharge is concerned, some comfort may be gained from the fact that such discharges from any cause are rare after 40 years of age and almost do not occur after 45.

If local treatment for the urethral discharge is carried out it should be with half strengths of any of the substances generally used for that purpose, to avoid the building up of protective squamous surfaces, later to shed and cause more urethral discharge.

IRREGULAR VAGINAL BLEEDING AND ENDOCRINOLOGIC TREATMENT

To the Editor:—My wife, now 44 years of age, who has always been a normal, healthy woman with regular menstrual periods, is now approaching the menopause. Menstruation has been irregular for the past few months and the period is longer than normal. Also she is rather nervous at this time for the first time during our twenty-three years of married life. I am an internist and have very little knowledge of what can be done to make this period of her life as normal as it should be. I do know, however, that much can be done and am asking you for information and advice. Will you please let me know what medicines, if any, should be given. I know that ovarian extracts are used; also I see "Ergoapiol," made by Martin Smith, which is freely advertised. Is this an "accepted" article? Please advise me and refer me to any pertinent literature.

M.D., South Dakota.

ANSWER.—In general there are three types of irregular vaginal bleeding at the menopause. First, there is bleeding which corresponds to a normal menstruation but which occurs not at the usual interval of approximately twenty-eight days but at multiples of this interval; that is, every two, three or four months. In other words, the patient is menstruating normally except that some periods are skipped completely. Irregularity of this type usually has no serious significance, but it should be carefully watched and, if it persists, cancer should be suspected. The second type of bleeding is menorrhagia; the periods occur at the usual intervals but the amount and duration of the flow are variable and excessive. Such irregularity is commonly the result of endocrine disturbances of a benign nature but occasionally is the first indication of carcinoma of the corpus uteri. The third type of irregularity is metrorrhagia, or bleeding between the menses. By common usage metrorrhagia signifies uterine bleeding occurring at unpredictable intervals, with no regularity of duration or amount. Such bleeding is of the gravest significance. While it may be the result of relatively harmless disorders (retained seccundines, polyps, endocrine disturbances), the physician bears a heavy responsibility until the diagnosis is assured. Particularly in women of middle age is metrorrhagia ominous, for they are in the "cancer period" and metrorrhagia is the chief sign of early carcinoma of the cervix.

Therefore the physician consulted by a patient in the forties because of "irregular menstruation" must be continually on guard and should advise biopsy of the cervix and curettage if he has any sound suspicion of cancer. Treatment is not permissible until cancer has been ruled out by biopsy, curettage and histologic examination. Since endocrine preparations have generally been of little value in correcting menopausal menorrhagia, castration by radium or x-rays (preceded of course by curettage) or hysterectomy is usually employed when the bleeding must be stopped. It is hardly necessary to add that postmenopausal bleeding should excite fear of cancer and demands thorough investigation at once.

The results of endocrine therapy in the treatment of vasomotor instability, nervousness and other subjective manifestations of the menopause have been discussed in THE JOURNAL, by Sevringhaus (Feb. 23, 1935, p. 624), Frank, Goldberger and Spielman (Aug. 11, 1934, p. 393) and Novak (May 18, 1935, p. 1815; Aug. 31, 1935, p. 662). Although Frank has been skeptical of the results of such treatment, most writers believe that the use of estrogenic substances is logical and of distinct value. Kurzrok (*Endocrinology* **16**:361 [July-Aug.] 1932) has studied the rate of excretion of estrogenic substance during the menopause and believes that replacement therapy is indicated when estrogenic products are not being excreted in the urine. Since it is not possible in general practice to determine the rate of excretion, patients are usually treated empirically. Novak recommends a dose of from 100 to 200 rat units daily (theelin, theelol, amniotin oral, progynon). This dosage applies if the administration is parenteral; the dose by mouth is five times as great.

Since the use of the drug is empirical, the dose should be increased until the desired effect is obtained. Provided carcinoma of the uterus has been ruled out, as it must be before treatment is begun, no danger is involved with these dosages.

Uterine bleeding may be a concomitant of the endometrial hyperplasia that results from the estrogenic drugs, and undesirable stimulation of the libido may be noted. If so, the dose should be decreased. If the flushes and nervousness diminish satisfactorily, the dosage should be gradually lowered and maintained at the empirically determined optimum level. None of Sevringhaus's ninety-five patients required treatment more than thirty months. The use of mild sedatives over long periods is recommended in conjunction with the endocrine therapy.

"Ergoapiol" is an irrational mixture rejected by the Council on Pharmacy and Chemistry in 1914. The discussions of Sevringhaus and of Biskind (THE JOURNAL, Aug. 31, 1935, p. 667) furnish detailed information on estrogenic substances now on the market.

FUNCTIONAL VOMITING

To the Editor:—A woman, aged 20, came to me for treatment in June 1935 with a complaint of vomiting without nausea within an hour after meals. She had been under treatment for three years by other physicians without improvement. The first time she vomited was in high school when she found she had a Latin teacher she did not like. She gradually began to vomit more frequently and sometimes vomited all three meals. She lost about 20 pounds (9 Kg.). She was vomiting all her meals when she came to me. She does not vomit water or candy. The patient is slender and weighs about 100 pounds (45 Kg.). Physical examination was essentially negative except for rather faulty posture. Blood pressure was 98 systolic, 66 diastolic, with a pulse of 87. A gastro-intestinal x-ray series showed a normal functioning stomach and intestine but a pronounced visceroptosis. There was no spastic condition of the pyloric valve. Roentgen examination of the esophagus showed the valve at the cardia to be half that of normal in its longitudinal measurement. Esophagoscopy showed nothing unusual. The basal metabolic rate was minus 10. The patient was put on six small dry meals a day. Fluids were given half way between feedings. She elevated the foot of the bed 12 inches. She wore a corset for correction of the visceroptosis. By August (three months) she was improved to such an extent that she would go two weeks without vomiting. Owing to warm weather (and without my consent) she quit wearing the corset. Vomiting became more frequent. During the summer she had irregular menstrual periods, sometimes missing one or two. During September and October I gave her injections of anterior pituitary, estrogenic substance and corpus luteum. Her menstrual cycle is normal now. She has bilateral tenderness in the lower quadrants. The hymen is intact. There is a rather profuse vaginal discharge, mucoid in character. She is sensitive to belladonna in dosage above six drops. She thinks her vomiting is of little less frequency when taking that amount. I have not done a gastric analysis. If you have any suggestions on treatment of cases of this type, I shall be glad to get them. Do not publish my name, please.

M.D., Ohio.

ANSWER.—From the description presented, it appears probable that the patient's symptoms are not due to gross organic pathologic changes either of the central nervous system or of the gastro-intestinal tract. As to the latter, there are no data suggestive of malignancy, chronic cholecystitis or gastric ulcer, nor is it likely that the vomiting can be attributed to visceroptosis, since a descent of the viscera of sufficient degree to cause emesis could not be corrected by an abdominal belt. Further, the rare possibility of a visceral constriction by a congenital peritoneal band, although not ruled out by an x-ray series done with the usual technic, is nevertheless incompatible with the comparatively late onset of the patient's symptoms or with their improvement under what seem to have been essentially suggestive measures of therapy. It would appear likely, then, that the patient's vomiting is of so-called functional origin. In this event, specific treatment of the symptoms alone can produce only a temporary amelioration, since a broader evaluation of the patient's personality and problems is essential for effective therapy. In the absence of more detailed information, it is of course idle to speculate as to the possible psychodynamic mechanisms underlying her illness; these can be discovered and treated only after careful investigation by a competent psychiatrist.

CIRCULATORY DIFFICULTIES IN ARTERIOSCLEROSIS

To the Editor:—A man, aged 45, has arteriosclerosis of the legs and feet due to diabetes, discovered recently. He feels well otherwise; he wants to walk but suffers greatly several hours after walking. What other exercise, active or passive, can he take? What can be done to relieve pain after walking? What are the possibilities of establishing collateral circulation and how could that process be assisted? Please omit name.

M.D., New York.

ANSWER.—It is important to know whether or not the arteriosclerosis indicated has caused occlusion of the main arteries to the extremities. This can be determined by palpation of the dorsalis pedis, posterior tibial and popliteal arteries for pulsations, notation of color changes when the feet are elevated and dependent, and estimation of the warmth of them.

Absent or diminished pulsations, abnormal pallor resulting from elevation, abnormal rubor resulting from dependence, and unusual coldness of the feet indicate occlusive arterial diseases. Conversely, normal or nearly normal pulsations, minimal color changes resulting from change of posture and warm feet indicate adequate arterial circulation. Intermittent claudication is a type of distress frequently resulting from arterial insufficiency. It is produced characteristically by exercise and relieved in a few minutes by rest. It is improbable that the distress mentioned by the correspondent is intermittent claudication, as it persists long after discontinuance of walking. However, the patient should be questioned carefully about the distress. Intermittent claudication has been treated with extracts of pancreas (insulin free) or of skeletal or heart muscle (Barker, Brown and Roth: *Tr. Am. Therap. Soc.* **33**:115, 1933; *Am. J. M. Sc.* **189**:36 [Jan.] 1935) or with intermittent negative and positive pressure as indicated by Herrmann and Reid and by Landis, reviewed by Allen and Brown (THE JOURNAL, Dec. 21, 1935, p. 2029). The last mentioned method may be valuable in establishing collateral circulation. Contrast baths, postural exercises and radiant heat and the intravenous injection of typhoid vaccine may aid likewise (Brown, G. E.: Thrombo-Angiitis Obliterans, *Surg., Gynec. & Obst.* **58**:297 [Feb.] 1934).

Diabetic neuritis must be considered in the diagnosis of the condition of the correspondent's patient. Usually there are manifestations of nerve injury, as diminished muscle strength, tendon reflexes or sensation. Frequently evidence of inadequate arterial circulation is likewise present. This is occasionally a very difficult condition to treat satisfactorily. Control of the diabetes is important. Measures to increase the circulation are indicated if the circulation is less than normal. Irradiation over the lumbosacral area by an experienced roentgenologist may diminish the distress. Recently, concentrated vitamin B has been found to be of value. A trial of it is certainly worth while.

INFERTILITY AND PRODUCTION OF SPERM

To the Editor:—I am not a urologist but an eye and ear specialist. I am interested in a very famous dog, with one exception probably the most prepotent sire of his breed ever imported into America. This dog is now not quite 5 years old. During his first two and a half years he was a prolific sire and in his stud career produced many great show winners. Without illness and without overwork, he suddenly began to miss with his bitches until he finally ceased entirely to produce pups, at about 3½ years of age. His desire is as normal as ever and his copulating ability unimpaired. This sterility seemed to be coincident with an atrophy and softening of the testicles. It was then noted that the testicles appeared unusually small compared with other dogs of his breed; but men vary in this particular and it may have been that the organs were always small. The dog was sent to the kennel of a professor of veterinary medicine in Toronto, where he remained about eight months, being given special attention in feeding, in the hopes that change of climate and so on might improve him. He was mated to half a dozen bitches in succession, with negative results. The professor used no sexual stimulants. As dogs are used in laboratories because their diseases and reaction to drugs are similar to those of men, I would ask: 1. Is there ever in mature life an atrophy of the testicles due to disease? 2. Are men in the prime of life (known to have been fertile) ever subject to such infertility as has come to this valuable dog? 3. Is there any remedy, not empirical, known to urologists, that will stimulate the production of spermatozoids? 4. Is there any explanation for the continuance of this dog's copulative virility and of the disappearance of spermatozoids? Such urologic books as I have consulted do not enlighten me on these questions. The professor in Toronto reported, after examination, absence of spermatozoids. Please omit name.

M.D., Louisiana.

ANSWER.—1 and 2. Yes. Several conditions, among them high febrile states, lead to some testicular diminution and loss of spermatozoa in man. Usually, perhaps, recovery may be expected to follow disappearance of the inciting cause, provided testis injury is not sufficiently great to have eliminated spermatogonia from the testis. It has been assumed, with apparently good grounds, that business worries or other psychologic states may sometimes be accompanied by temporary azoospermia. In highly pedigreed stock (especially stallions and jacks) great difficulty is experienced in keeping them in good breeding condition.

3. Remedies thus far attempted fall largely into two general classes: (*a*) nutritional and (*b*) endocrine. Proper food and exercise outdoors have been greatly emphasized. It is known that dogs confined to laboratory cages and fed well may lose temporarily the capacity to produce spermatozoa. Wheat germ oil has been tried as a supplementary dietary factor. Endocrine treatments have been largely restricted to introduction of gonad-stimulating substances. Reports on human cases of male sterility suggest occasional beneficial results from treatments with injections of the gonadotropic principle of pregnancy urine. Daily injections of 100 to 500 rat units for a few weeks might prove efficacious in restoring spermatozoa to the discharge.

4. There are many cases in which spermatozoa are not formed and yet copulative ability is retained. Such is true for all naturally occurring cryptorchids (undescended testes) in which both testes are retained in the abdomen. The germ cells, so far as known, do not contribute to the internal secretion of the testis which is responsible for inciting the copulatory drive.

IMPLANTATION OF GOLD SPHERE IN TENON'S SPACE

To the Editor:—Is the operative procedure of implanting a gold sphere in Tenon's space one that is generally accepted by the medical profession and used by leading ophthalmologists? It is my understanding that this procedure is considered safe so far as the health and life of the patient are concerned, and that it is generally accepted as a constructive technic for better cosmetic results when an eye has to be enucleated. I have never known any complications to arise other than the occasional loss of the gold sphere from the orbit at a later date. My reason for proposing this question is that a number of months ago I enucleated an eye for a patient and implanted a gold sphere. It was a clean case. There were no complications. The cosmetic result was good and there was good motility of the artificial eye. I am now the defendant in a $50,000 malpractice suit in which the plaintiff alleges that it was wrongful to implant the gold sphere and that six months later it was necessary for him to have the gold sphere removed in order to save his life. I was not informed by the other ophthalmologist of any trouble with the orbit. This man rushed the patient to the hospital and removed the sphere. The first information that I received about the removal of the sphere was when the sheriff served me wth the court summons.

M.D., Indiana.

ANSWER.—The implantation of a gold ball has been practiced since it was first proposed by Webster Fox in 1902. Numerous articles recommending that technic have appeared, particularly by Greenwood (*Arch. Ophth.* **43**:1, 1914), Dimitry (*Am. J. Ophth.* **2**:653 [Sept.] 1919), Carrasco (*Zentralblat. f. d. ges. Ophth.* 1921) and others. In general, the procedure is recognized by ophthalmic surgeons throughout as a legitimate, safe procedure. It is impossible to conceive of any condition occasioned by the gold sphere that could endanger the life of a patient. If a malignant tumor had developed in the orbit, in no way could it be attributed to the presence of the gold sphere. It is suggested that an endeavor be made to find out why the other ophthalmologist considered it essential to rush the patient to operation "to save his life."

THE CONSTITUENTS OF TOBACCO SMOKE

To the Editor:—Does smoking tobacco have any proved effect on the thyroid or on thyrotoxicosis? Does tobacco contain iodine? Also please state if possible why so many people gain weight rapidly after discontinuing tobacco.

DENVER F. GRAY, M.D., Rusk, Texas.

ANSWER.—Dr. Walter A. Bastedo in his article "What the Physician Should Know About Tobacco" says that in some cases of hyperthyroidism the use of tobacco raises the basal metabolism. None of the several available publications that discuss the constituents of tobacco make any reference to the presence of iodine in tobacco smoke. In addition to nicotine and its derivatives, tobacco smoke contains such toxic substances as pyridine, thiotetrapyridine and isodipyridine, prussic acid, pyrolin, ammonia, collidine, formaldehyde and carbon monoxide. In his book "Tobacco and Physical Efficiency: A Digest of Clinical Data," Pierre Schrumpf-Pierron quotes other investigators to the effect that collidine is more poisonous than nicotine, although there are only traces of it in tobacco smoke. The smoke of ten cigars, this author notes, contains from 4 to 5 mg. of prussic acid. The smoke of 1 Gm. of tobacco contains from 0.9 to 1.2 mg. of pyridine, thiotetrapyridine and isodipyridine; investigators differ as to whether these products share in the poisonous effects of tobacco. One gram of tobacco yields from 3.22 to 5 mg. of ammonia. The formaldehyde in tobacco smoke, combined as it is with the nicotine, is said to diminish the toxicity of the smoke. Authorities agree that carbon monoxide is one of the most harmful elements of tobacco smoke from a practical point of view. Baumberger found that tobacco smoked as cigarets yields about 8.3 cc. of carbon monoxide per gram of tobacco smoked and that about 61 per cent of the carbon monoxide is absorbed, if the smoke is inhaled.

It is not necessarily true that people gain weight rapidly after discontinuing the use of tobacco. In some persons tobacco lessens the appetite and the pangs of hunger; when not habituated to tobacco, such persons naturally would eat more food, and that may account for their increase in weight after discontinuing the use of tobacco.

CHRONIC ENDOCERVICITIS

To the Editor:—What are the possible causes of a persistent mucopurulent (predominantly mucoid) discharge from the cervix uteri, of eight months' duration, in a white woman, aged 30, with a ruptured hymen (but whose other pelvic organs appear to be normal to bimanual examination), with a normal menstrual history except for a prolonged interval of about three weeks, one year ago. The discharge is negative for gram-negative diplococci and Trichomonas on repeated examination. The cervix bleeds slightly when the mucus is removed too thoroughly with a cotton applicator. A biopsy was negative for evidence of malignancy. The discharge did not disappear on endocervical coagulation, although a concomitant erosion did. Are there any factors above the cervix that might be responsible? In what manner does the sex life influence such discharges aside from infection? Would you recommend ionization with a surgical diathermy electrode?

M.D., Pennsylvania.

ANSWER.—The patient has endocervicitis and the infection is probably persistent because of inadequate drainage.

The etiology of such infections is not only of interest but also of therapeutic importance. In the case of gonorrheal disease it is seldom possible to identify the gonococcus in the cervical discharge after the early weeks of infection. In establishment of a diagnosis, a history of exposure and demonstrable infection of Skene's ducts and/or the Bartholin glands affords more dependable evidence than search for the gonococcus, although the latter is not to be deprecated.

Postabortive infection, cervical lesions incident to childbirth, and instrumentation and medication of the cervix in attempted relief of various disorders are other common causes of persistent mucopurulent leukorrhea.

As stated, in the majority of instances the discharge persists because drainage is inadequate. There may be gross obstruction of the cervical canal or, more frequently, there are microscopic pockets that fail to drain. Endocervical cauterization owes its efficiency to establishment of drainage rather than to eradication of the cervical glands.

Infection above the level of the cervix is seldom responsible for a persistent discharge; even in the case of pyometra an obstruction of the cervix is usually the primary cause of the trouble.

In the treatment of persistent mucopurulent cervical discharge a Hegar dilator should be passed to make certain whether the canal is sufficiently patent. Granted that there is no demonstrable gross obstruction, radial endocervical cauterizations with a nasal tip cautery may suffice to effect a cure. Some prefer endocervical coagulation. In the event that these measures fail, amputation of the cervix, or even a complete hysterectomy, may be necessary in extreme cases.

SENSITIVITY TO CHICKEN AND EGGS

To the Editor:—I find that I am sensitive to chicken and all products, as severe gastro-intestinal symptoms follow the eating of chicken or eggs in all forms, and the exposure to feathers or dust of a coop brings on severe congestion of the conjunctiva, asthma, and later, as the bronchial mucus is swallowed, the familiar gastro-intestinal symptoms. Is there anything I can do to develop an immunity? My literature is either barren or so voluminous that the grain of truth is lost in the mountain of chaff.

M.D., San Francisco.

ANSWER.—The antigens of chicken, eggs and feathers are not related, although one of the proteins of egg white is the same as one of those found in chicken serum. Clinical sensitivity, therefore, to these three antigens in the same person should be considered probably as a coincidence, and treatment should be directed to each one of the three separately.

The simplest and probably the most effective treatment against all three of these antigens is their complete elimination from the individual's diet and environment. Any food containing even a trace of egg, for instance, should be avoided. After such complete elimination for a year or more, the result is frequently an increased tolerance to the food so that small amounts, as, for example, the amount of egg used in baking and cooking, may be tolerated.

Oral immunization to foods may be tried when elimination is not possible. Several forms of oral immunization have been tried. First, the feeding of a minute amount (i. e., two or three drops of egg white, in relatively low grade cases of sensitivity) about one half to three quarters of an hour before the meal containing the antigen responsible for the trouble. This has been discussed by K. P. Eiselsberg and F. Kauders (*Wien. klin. Wchnschr.* **47**:679 [June 1] 1934), who give extensive references. Another method is that of the feeding of specific propeptan before the meal (Urbach, Ehrich: Skin Diseases and Nutrition, Vienna, Wilhelm Mandrich, 1932). A third method is to start with a very dilute solution of the antigen, increasing the dosage very gradually every third or fourth day and always

keeping below the dose that produces a constitutional reaction (Rackemann, F. M.: Clinical Allergy, New York, Macmillan Company, 1931, p. 313 and following).

Injection of food antigens is dangerous and is not to be recommended for use except by a worker trained in allergy.

If feathers cannot be completely avoided, subcutaneous injections for hyposensitization are advisable. These should be given very gradually, starting with a dilute solution.

CORPUS LUTEUM CYST

To the Editor:—A white woman, aged 22, single, a school teacher, weighing 125 pounds (57 Kg.) and 5 feet 6 inches (168 cm.) in height, complains of pains in the stomach intermittently before menstruation starts; the periods are irregular, scanty, of one to two days' duration, and accompanied by cramps at times. Recently I was called to see her. The temperature was 98.6 F., the pulse 60. She was complaining of cramps in the lower part of the abdomen with pains going to both shoulders, aggravated to such an extent by changing position that she screamed with pain. The woman was well developed, was a brunette, and had numerous large coarse black hairs from the symphysis to the umbilicus, with tenderness over the tubes and bladder, and marked tenderness over the pit of the abdomen. Otherwise the physical examination was essentially negative. In four fours I was called to see the patient again. This time she was complaining of shortness of breath and marked distention of the stomach, with pyrosis, nausea and vomiting. The temperature was 97, the pulse was 120, and the hands and legs were covered with a cold clammy sweat. I washed out her stomach, gave her a purgative and corpus luteum 1 cc. intramuscularly and advised fluids and heat. Later in the afternoon I saw the patient again. She was resting much better. The temperature was 98.6, the pulse 120. The next day she began to menstruate. She was much improved. The following day she came to my office. The blood count was 6,750 leukocytes, 3,300,000 erythrocytes, hemoglobin 75 per cent and the urine was normal. The patient's mother died of cancer about two years ago. What is the diagnosis of this case and the physiologic mechanism back of the trouble? Is there a possibility of a neoplasm at her age? What treatment would you advise? Does one have to consider acute pancreatitis? The patient has had a number of these attacks before her periods, but none so severe, and in none has she had such definite symptoms of shock. The patient had always been in good health before these attacks started and has been gaining in weight. Please omit name. M.D., Missouri.

ANSWER.—One must consider particularly the presence of a corpus luteum cyst because of the premenstrual disturbances, and the possibility of rupture at the time of the symptoms of shock. Sometimes the rupture of the cyst may lead to spontaneous cure, or again the cyst may recur. No note is made of a rectal examination. The result of such an examination revealing a cystic enlargement is valuable in the diagnosis. Other types of pelvic disorder may be present. It would be advisable to have a pneumoperitoneum made and an x-ray film of the pelvic organs for further elucidation.

LOW SPECIFIC GRAVITY OF URINE

To the Editor:—What is the significance of a urinalysis with specific gravity of practically 1.000 the last fifteen years with no albumin or other gross abnormality, and with the color almost like that of water? The patient is now past 82 years of age. He has never had any serious illness and apparently is in perfect health with the possible exception of slight prostatic enlargement necessitating arising once or twice a night for urinating, sometimes but not always. Does low specific gravity always mean abnormality? I am the patient. Please omit name.

M.D., South Dakota.

ANSWER.—The normal urine volume and specific gravity are a function of the fluid intake and of the amount of loss of fluid either by perspiration or from the lungs and intestinal tract. The total solids excreted daily are somewhat less variable and average about 60 Gm. As a result, the specific gravity tends to vary in inverse ratio to alterations in volume. The normal range of specific gravity in this country is about 1.008 to 1.028. The specific gravity decreases with increased intake of fluids. However, it never drops to 1.000. Such a reading indicates the use of an inaccurate urinometer. In diabetes insipidus, associated with a lesion in the posterior lobe of the pituitary gland or the adjacent area of the brain, the patient may secrete from 3 to 30 liters of urine with a specific gravity as low as 1.001.

A low specific gravity of the urine, except in diabetes insipidus, does not alone indicate any abnormality. If the kidney function is normal, the avoidance of fluids for twenty-four hours should cause the specific gravity of the urine to rise to 1.025 or higher, and the drinking of from 1,200 to 1,500 cc. of water should cause a drop to 1.003. The specific gravity of the urine in itself is the most useful single test of renal efficiency and plays an important part in the concentration and dilution tests of kidney function.

USE OF MANGANESE IN HYPERGLYCEMIA

To the Editor:—Please inform me whether there is any scientific background for the use of manganese dioxide in the treatment of hyperglycemia with glycosuria. I have a patient who had from one to four plus sugar in the urine regularly before she began taking manganese dioxide, 5 grains (0.3 Gm.), after each meal. The urine is now free from sugar but she feels rather weak. What is the probable explanation of this? Could it be due to the manganese dioxide she has been taking? How long is it safe to administer manganese dioxide in 10 to 15 grain (0.65 to 1 Gm.) doses daily? Is there any danger of ill effect of any nature, and, if so, what are the usual initial symptoms? Please omit name. M.D., Georgia.

ANSWER.—Manganese resembles iron in that it is absorbed with difficulty and eliminated chiefly in the stools. Chronic manganese intoxication has thus far been observed only in workmen exposed to massive inhalation of manganese dust. It presents a symptom complex of muscular weakness and tremor, resembling somewhat that of parkinsonism but often accompanied by psychic disturbance. The condition has not been reported from the medicinal use of manganese. Experiments on rabbits have proved negative as to any effect on carbohydrate metabolism. It is only when such animals were subjected to chronic poisoning by subcutaneous injections of manganese sulfate that hypoglycemia was produced, to a marked degree only in the terminal stages. Without data as to the patient's diet it is impossible to evaluate the observation recorded. The patient should be treated by the proper and adequate ingestion of suitable food and the care of the diabetic condition along accepted lines.

DIAGNOSIS OF UNUSUAL ERUPTIVE DISORDER

To the Editor:—A boy, aged 11 years, gives a negative history except for an attack similar to the one from which he is now suffering, about a year ago, which lasted for three months. He is robust and physically normal with the exception of 1 degree of elevation in temperature. There is no local evidence of focal infection. The present complaint is an eruption of the skin extending over the entire anterior surface of the chest, the skin showing very small vesicles rather close together. The skin is boggy and apparently contains fluid in the deeper tissues. The dependent portion of the area is edematous. The skin is sore and itchy, though not reddened. The patient is unable to walk in the upright position because of his desire to keep the clothing from touching the skin. In three days the condition has cleared up in the upper part of the chest but is present over the abdomen, upper part of the thighs, and scrotum. The urine is normal chemically and microscopically.

ROLLIN D. WORDEN, M.D., Ravenna, Ohio.

ANSWER.—On the basis of the history given it would seem that a diagnosis should be considered from three special points of view: (1) allergic, (2) parasitic and (3) bacteriologic.

The customary tests for allergy may be helpful in eliminating this possibility. Scrapings from the skin might disclose that the condition is due to an extensive scabies with an accompanying cellulitis; or a staphylococcic infection of the skin might be determined.

Treatment will depend primarily on the cause of the condition, but in any event soft clean muslin underwear should be worn next to the skin. The underwear must be changed daily. The parts involved should be bathed with bran water without the use of soap if the skin is much irritated. Calamine lotion without phenol (carbolic acid) may be useful in relieving the itching. Until a definite diagnosis is established, other essentials for successful treatment cannot be decided on.

EFFECTS OF CERVICAL SYMPATHECTOMY

To the Editor:—What are the late results of cervical sympathectomy? Textbooks and journals to which I have access give no information as to harmful sequelae that may appear, because of the operation, from five to fifteen years after resection of the cervical sympathetic ganglions. Alexander performed bilateral extirpation of the superior cervical sympathetic ganglions in 1889 for epilepsy, and Jaboulay, Jonnesco and Ball did the same operation for other conditions. The operation as employed in the earlier cases was soon discarded, but Jonnesco's operation in 1916 for anginal pain has become a recognized clinical procedure. Sufficient time has now elapsed for reports of harmful late sequelae to appear in the literature if there are any. E. A. PETERMAN, M.D., Detroit.

ANSWER.—A unilateral cervical sympathectomy results in the unilateral Horner's syndrome, which of course is rather unsightly, since the pupil on the operated side is slightly smaller than on the opposite side. The upper lid has a tendency to droop as a result of the section of the sympathetic fibers to the small muscle that is situated between the lid margin and the tarsal plate, the tarsalis muscle. There is an associated dryness of the skin and this is particularly evident when a bilateral cervicothoracic sympathectomy has been performed. The dryness does not result in any skin diseases and is readily protected by natural oils such as the wool fats.

There have been no cerebral disturbances even though the operations have not altered the convulsive procedures.

In a few instances the increased blood supply to the mucosa of the nose and nasopharynx has resulted in a sensation of stuffiness. This phenomenon of increased blood supply has been of a more beneficial than detrimental factor in most instances.

CONNECTION OF MUSCLE FIBER AND TENDON

To the Editor:—What is the histologic picture and the manner of connection of muscle fiber and tendon fiber?

M.D., New York.

ANSWER.—The exact nature of the connection between muscle fibers and tendon fibers requires further investigation. The sarcolemma that encloses the muscle fibers is closely attached to the white fibers of the tendons, apparently more closely attached to the tendon fibers than to the muscle fibrils themselves. Some authors (Schultze) have shown an apparent continuity in some animals of muscle fibrils across the sarcolemma with the white fibers of tendons. In other animals there is no such continuity and the muscle fibrils are easily detached from the sarcolemma at the end of a muscle fiber. It is possible that the mode of attachment of muscle fibrils to sarcolemma or to tendon fibers differs in different animals.

The connective tissue network made of white fibers and elastic fibers, which surrounds individual muscle fibers, is directly continuous with the similar network that surrounds bundles of white fibers in the tendon, and undoubtedly the greater part of the pull of contracting muscle fibers is transmitted through this continuous connective tissue envelop rather than through the attachment of muscle fibril to sarcolemma and to tendon fibers. See Baldwin: *Morphologisches Jahrbuch* **45**:249, 1912.

HAZARD OF TETANUS IN SEWING MATTRESSES

To the Editor:—In caring for patients who work in a PWA mattress factory, I have been using tetanus antitoxin in all cases of puncture wounds with a needle. The cotton is unprocessed and I was afraid of tetanus. However, many of the women injure themselves and never report it. So far no case of tetanus has ever developed. Do you feel that it is necessary to use tetanus antitoxin in such cases? Please omit name and address.

M.D., Ohio.

ANSWER.—Unless tetanus is present in the community or unless cases of tetanus have been reported from wounds produced in connection with unprocessed cotton, there is no need of giving tetanus antitoxin.

It would be well, however, to sterilize the needles at frequent intervals and to have the workers wash their hands frequently with soap and hot water, in order to minimize the danger of other types of infection.

SYMPATHECTOMY IN ANGINA PECTORIS

To the Editor:—Would you kindly let me know for the benefit of a relative the present status of sympathectomy in angina pectoris? Is advanced age a contraindication?

M.D., Havana.

ANSWER.—A sympathectomy that includes the superior cervical sympathetic ganglions or the cervicothoracic stellate ganglions is of moderate value in the treatment of angina in younger patients not over 45 years of age, when vasospasm appears to be the predominant feature in the pain complex. Either one of these operations interrupts the fibers carrying the vasomotor impulses to the coronary arteries. The stellate ganglion resection not only interrupts the fibers carrying the vasomotor stimuli but also interrupts some of the fibers carrying afferent pain sensations.

Advanced age definitely contraindicates a sympathectomy, since the cardiac symptoms are probably due more to sclerotic changes than to any vasospasm.

STAB WOUND OF PRECORDIUM

To the Editor:—Nov. 15, 1935, a young Negro was stabbed in the precordial region, the wound opening the pericardial sac and penetrating the lung in that region. The heart muscle was exposed quite extensively but the pericardium was not repaired. The chest wound was closed and healed readily but the patient is not recovering his strength. He complains of weakness and lack of appetite, and he is losing weight. I would be glad to have your opinion about this case. Please omit name.

M.D., Indiana.

ANSWER.—It is not possible to answer the question on the basis of the data available. It would seem, however, that the symptoms are not due to the results of the wound, if this has healed without infection or complications. The patient should be examined for some other source of infection, and perhaps the postoperative therapy should be critically reviewed. One occasionally overdoes medication in a critical case.

Medical Examinations and Licensure

COMING EXAMINATIONS

STATE AND TERRITORIAL BOARDS

ALABAMA: Montgomery, June 23-25. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

ALASKA: Juneau, Sept. 1. Sec., Dr. W. W. Council, Juneau.

ARIZONA: Phoenix, July 7-8. Sec., Dr. J. H. Patterson, 826 Security Bldg., Phoenix.

ARKANSAS: *Basic Science.* Little Rock, Nov. 2. Sec., Mr. Louis E. Gebauer, 701 Main St., Little Rock. *Medical (Regular).* Little Rock, Nov. 10. Sec., Dr. A. S. Buchanan, Prescott. *Medical (Eclectic).* Little Rock, Nov. 10. Sec., Dr. Clarence H. Young, 207½ Main St., Little Rock.

CALIFORNIA: San Francisco, July 6-9, and Los Angeles, July 20-23. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

COLORADO: Denver, July 7. Sec., Dr. Harvey W. Snyder, 422 State Office Bldg., Denver.

CONNECTICUT: *Medical (Regular).* Hartford, July 14-15. *Endorsement.* Hartford, July 28. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden. *Medical (Homeopathic).* Derby, July 14. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: July 14-16. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, Dover.

DISTRICT OF COLUMBIA: Washington, July 13-14. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

HAWAII: Honolulu, July 13-16. Sec., Dr. James A. Morgan, 48 Alexander Young Bldg., Honolulu.

IDAHO: Boise, Oct. 6. Commissioner of Law Enforcement, Hon. Emmitt Pfost, 205 State House, Boise.

ILLINOIS: Chicago, June 23-26. Superintendent of Registration, Department of Registration and Education, Mr. Homer J. Byrd, Springfield.

INDIANA: Indianapolis, June 23-25. Sec., Board of Medical Registration and Examination, Dr. William R. Davidson, Room 5 State House Annex, Indianapolis.

IOWA: *Basic Science.* Des Moines, July 14. Sec., Prof. Edward A. Benbrook, Iowa State College, Ames.

MAINE: Augusta, July 7-8. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MASSACHUSETTS: Boston, July 14-16. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MISSISSIPPI: Jackson, June 22-23. Sec., State Board of Health, Dr. Felix J. Underwood, Jackson.

MONTANA: Helena, Oct. 6. Sec., Dr. S. A. Cooney, 7 W. 6th Ave., Helena.

NEW HAMPSHIRE: Concord, Sept. 10-11. Sec., Board of Registration in Medicine, Dr. Charles Duncan, State House, Concord.

NEW MEXICO: Santa Fe, Oct. 12-13. Sec., Dr. Le Grand Ward, Santa Fe.

NEW YORK: Albany, Buffalo, New York and Syracuse, June 22-25, Chief, Professional Examinations Bureau, Mr. Herbert J. Hamilton, 315 Education Bldg., Albany.

NORTH DAKOTA: Grand Forks, July 7-10. Sec., Dr. G. M. Williamson, 4½ S. 3d St., Grand Forks.

OREGON: *Basic Science.* Corvallis, July 18. Sec., Mr. Charles D. Byrne, University of Oregon, Eugene.

PENNSYLVANIA: Philadelphia and Pittsburgh, July 7-11. Sec., Board of Medical Education and Licensure, Mr. Clarence E. Ackley, 400 Education Bldg., Harrisburg.

PUERTO RICO: San Juan, Sept. 1. Sec., Dr. O. Costa Mandry, Box 536, San Juan.

RHODE ISLAND: Providence, July 2-3. Chief, Division of Examiners, Mr. Robert D. Wholey, 366 State Office Bldg., Providence.

SOUTH CAROLINA: Columbia, June 23. Sec., Dr. A. Earle Boozer, 505 Saluda Ave., Columbia.

SOUTH DAKOTA: Rapid City, July 21-22. Dir., Division of Medical Licensure, Dr. Park B. Jenkins, Pierre.

TEXAS: Austin, June 23-25. Sec., Dr. T. J. Crowe, 918-19-20 Mercantile Bldg., Dallas.

UTAH: Salt Lake City, July 10. Dir., Department of Registration, Mr. S. W. Golding, 326 State Capitol Bldg., Salt Lake City.

VERMONT: Burlington, June 24. Sec., Board of Medical Registration, Dr. W. Scott Nay, Underhill.

WASHINGTON: *Basic Science.* Seattle, July 9-10. *Medical.* Seattle, July 13-15. Dir., Department of Licenses, Mr. Harry C. Huse, Olympia.

WEST VIRGINIA: Bluefield, July 13. State Health Commissioner, Dr. Arthur E. McClue, Charleston.

WISCONSIN: Milwaukee, June 30-July 3. Sec., Dr. Robert E. Flynn, 401 Main St., La Crosse.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS. *Parts I and II.* June 22-24 and Sept. 14-16. Ex. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

SPECIAL BOARDS

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Written examination and review of case histories of Group B candidates will be held in various cities in the United States and Canada, Nov. 7. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh (6).

AMERICAN BOARD OF OPHTHALMOLOGY: New York, Sept. 26. *All applications and case reports must be filed sixty days before date of examination.* Address, 122 So. Michigan Ave., Chicago.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: Cleveland, Jan. 9. Sec., Dr. Fremont A. Chandler, 180 N. Michigan Ave., Chicago.

AMERICAN BOARD OF OTOLARYNGOLOGY: New York, Sept. 25-26. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

AMERICAN BOARD OF PEDIATRICS: Baltimore and Cincinnati in November. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: New York, Dec. 29-30. Sec., Dr. Walter Freeman, 1028 Connecticut Ave., Washington, D. C.

AMERICAN BOARD OF RADIOLOGY: Cleveland, Sept. 25-27. Sec., Dr. Byrl R. Kirklin, Mayo Clinic, Rochester, Minn.

Pennsylvania January Examination

Mr. Clarence E. Ackley, secretary, State Board of Medical Education and Licensure, reports the examination given in Philadelphia, Jan. 14-16, 1936. Forty-two candidates were examined, 41 of whom passed and 1 failed. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
Georgetown University School of Medicine		(1931), (1933), (1934, 2)	4
American Medical Missionary College, Chicago		(1902)	1
State University of Iowa College of Medicine		(1933)	1
University of Maryland School of Medicine and College of Physicians and Surgeons		(1934)	1
Boston University School of Medicine		(1934)	1
University of Minnesota Medical School		(1933)	1
St. Louis University School of Medicine		(1923)	1
Washington University School of Medicine		(1934)	1
Long Island College Hospital		(1906)	1
University of Buffalo School of Medicine		(1933)	1
Hahnemann Medical College and Hospital of Philadelphia		(1934, 3)	3
Jefferson Medical College of Philadelphia		(1933, 4), (1934, 5)	9
Temple University School of Medicine		(1934, 3)	3
Univ. of Pennsylvania School of Medicine		(1933, 2), (1934)	3
University of Pittsburgh School of Medicine		(1934, 2)	2
Woman's Medical College of Pennsylvania		(1933), (1934)	2
University of Virginia Department of Medicine		(1933)	1
University of Wisconsin Medical School		(1933)	1
Dalhousie University Faculty of Medicine		(1932)*	1
McGill University Faculty of Medicine		(1934)	1
Regia Università degli Studi di Roma. Facoltà di Medicina e Chirurgia		(1931)†	1
University of St. Andrews Conjoint Medical School, Scotland		(1934)	1

School	FAILED	Year Grad.	Number Failed
Johns Hopkins University School of Medicine		(1913)	1

Nine physicians were licensed by endorsement from January 6 through January 30. The following schools were represented:

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
University of California Medical School		(1916)	California
University of Colorado School of Medicine		(1934)	N. B. M. Ex.
Northwestern University Medical School		(1931)	Illinois
Johns Hopkins University School of Medicine		(1921)	Maryland
Harvard University Medical School		(1930)	N. B. M. Ex.
University of Minnesota Medical School		(1923)	N. B. M. Ex.
New York University, University and Bellevue Hospital Medical College		(1931)	New York
Hahnemann Medical College and Hospital of Philadelphia		(1934)	N. B. M. Ex.
Marquette University School of Medicine		(1919)	Wisconsin

* License has not been issued.
† Verification of graduation in process. License has not been issued.

Maine March Report

Dr. Adam P. Leighton, secretary, Maine Board of Registration of Medicine, reports the written examination held in Portland, March 10-11, 1936. The examination covered 10 subjects and included 100 questions. An average of 75 per cent was required to pass. Ten candidates were examined, all of whom passed. Two physicians were licensed by reciprocity and 2 physicians were licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Georgetown University School of Medicine		(1934)	85
Northwestern University Medical School		(1935)	90
Boston University School of Medicine		(1933)	85
Tufts College Medical School		(1935)	85
Creighton University School of Medicine		(1934)	86
University of Vermont College of Medicine		(1935)	91
McGill University Faculty of Medicine		(1909) 89, (1935)	88, 89
Regia Università degli Studi di Milano. Facoltà di Medicina e Chirurgia		(1931)	79*

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Harvard University Medical School		(1930)	Ohio
Vanderbilt University School of Medicine		(1930)	Tennessee

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Yale University School of Medicine		(1933), (1934)	N. B. M. Ex.

* Verification of graduation in process.

Wyoming Reciprocity Report

Dr. G. M. Anderson, secretary, Wyoming State Board of Medical Examiners, reports 4 physicians licensed by reciprocity after an oral examination given in Cheyenne, Feb. 10, 1936. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Colorado School of Medicine		(1932)	Colorado
University of Illinois College of Medicine		(1932)	Illinois
State University of Iowa College of Medicine		(1934)	Iowa
University of Tennessee College of Medicine		(1930)	Missouri

Book Notices

The National Formulary. Sixth Edition. National Formulary VI. Prepared by the Committee on national formulary, by authority of The American Pharmaceutical Association. Official from June 1, 1936. Cloth. Price, $5. Pp. 556. Washington, D. C.: American Pharmaceutical Association, 1935.

Concurrent with the appearance of the new U. S. Pharmacopeia, the sixth edition of the National Formulary became available. The revisions of this standard reference work, although less significant than changes in the Pharmacopeia, do have their influence on drug therapy and prescription writing. The 320 items omitted are relatively unimportant, because most of them have long since passed into the realm of unnecessary (but unfortunately still prescribed) drugs. The 239 additions include eighty-three items discarded by the Pharmacopeia. Only twenty of these drugs were included in the later editions of Useful Drugs; only two are to be retained in the forthcoming edition — lime and pilocarpine hydrochloride. Other additions include dosage forms of new Pharmacopeial items, several preparations derived from New and Nonofficial Remedies, and at least one (tetrachloroethylene) from medical literature. It is difficult to understand why some items are continued in the present edition. Elixir of five bromides and the compound elixir of glycerophosphates containing eleven ingredients appear to be entirely superfluous. In accord with the admission to the Pharmacopeia of emulsion of liquid petrolatum, the National Formulary admits emulsion of liquid petrolatum with phenolphthalein. The number of fluidextracts has been greatly reduced, while the ampules and tablets have increased in number. Ampules involve the use of "ampule glass," "ampule water" and "ampule oil," the latter being "any bland fixed oil" controlled (only) as to acidity. Tablets are described according to the percentage content and not their dosage size. Thus, any size tablet may be official (this is true also of the one official U. S. P. tablet). The Formulary describes iso-alcoholic elixir, which is a mixture of a low and a high alcoholic elixir in correct proportions for the ingredients. The new syrup of cherry has been noted to be superior to the older syrup of wild cherry. The oral use of the newly admitted ovary, corpus luteum and anterior pituitary is contrary to practical therapeutics. The make-up of the book is improved, the index extensive, and there has been cooperation on many points with the new Pharmacopeia. It has never been established that a second book of standards is essential to pharmacotherapeutics. Certainly, as far as the physician is concerned, this second official standard is of much less importance than the U. S. Pharmacopeia.

Experimental Changes in Liver Function: A Contribution to the Diagnosis of Liver Function. Av Yngve Åkerrén, Med. Lic. av Södermanlands-Nerikes Nation. Akademisk avhandling som med tillstånd av medicinska fakulteten i Uppsala för vinnande av medicinisk doktorsgrad till offentlig granskning framställes. Paper. Pp. 287. Uppsala: Almqvist & Wiksells Boktryckeri-A.-B., 1934.

Åkerrén has carried out an extensive piece of work to see whether, following inanition or the giving of a ketogenic diet, signs of deficient liver function can be elicited with the several tests in common use. The work was done on patients, many of them children, who did not have any sign of liver disease. Åkerrén first studied the amount of urobilin in the urine and found no consistent increase in the patients who were on the ketogenic regimen. There was only one person who showed an excessive urobilinuria when following this regimen or when fasting. The administration of sodium bicarbonate or of a mixture of citric acid and sodium citrate in doses of from 15 to 29 Gm. in the twenty-four hours caused a definite increase in the amount of urobilin in the urine. Åkerrén next studied the influence of a ketogenic diet on the assimilation of galactose. Here he found a definite decrease in the ability of the patients to handle the sugar. Not only did more galactose appear in the urine but there was an increase in the blood sugar. If enough carbohydrate was added to the protein and fat to prevent ketonuria, there was no abnormality in the handling of the galactose. Similar observations were made with levulose. Either the ketogenic diet or fasting commonly gave rise to a positive Hay's test, which appears to be an exceedingly delicate

test for the presence of bile acids in the urine. The ketogenic diet did not produce an increase of bilirubin in the serum. Åkerrén believes that the lessened ability of the body to assimilate galactose following the use of a ketogenic diet is due to injury to the liver, and he thinks that this may well be due to a decrease in the glycogen content of this organ and to an increased formation of ketone bodies there. He believes also that, in some cases of jaundice produced mechanically, the glycogen content of the liver is probably lessened and as a result the assimilation of galactose is interfered with. Åkerrén believes that the changes in the blood sugar which he observed are due to injury to the liver. Many of his arguments are based on a review of the literature.

This monograph should be of considerable interest to every one who is studying liver function. As the author points out, there still is much to learn about the rationale of the tests used for the estimation of liver function; thus far most of them have been used only empirically. Åkerrén is most appreciative of the work of Mann and Bollman on animals, but, as he says, it is one thing to remove six sevenths of a dog's liver and to test the function of the remaining seventh with its perfectly normal cells, and it is another thing to test in man the function of a full sized liver with perhaps every one of its cells slightly damaged or inhibited in some way.

The Tuberculin Handbook. By Halliday Sutherland, M.D., Honorary Physician to the Queen Alexandra Sanatorium Fund, London. Cloth. Price, $2.75. Pp. 96, with 14 illustrations. New York & London: Oxford University Press, 1936.

Sutherland states in the preface that he believes that, apart from the discovery of the tubercle bacillus, tuberculin in the diagnosis and treatment of tuberculosis is Koch's greatest gift to mankind. The chapter on the discovery of tuberculin deals with the early work of Koch and the preparation of various kinds of tuberculin that have been used from time to time. The Use of Tuberculin is a summary of the symptoms, signs and x-ray appearances of the disease in early pulmonary tuberculosis. He cites cases to show the impossibility of making diagnoses by x-ray films without the use of tuberculin, for "by means of the tuberculin tests pulmonary tuberculosis can be distinguished from all other diseases of the lung, and what is of greater value to the patient and to the community the disease can be diagnosed in its earliest stages long before tubercle bacilli have appeared in the sputum." He further states that none of the early symptoms, physical signs or x-ray appearances are in themselves either singly or combined diagnostic of pulmonary tuberculosis and that the key to their interpretation is in the tuberculin test. The cutaneous tests, such as those of Pirquet and Moro, are presented. Here attention is called to the work of Bernard and others, who separated 171 infants with positive reactions from their tuberculous parents. Over a period of four years of subsequent observation, 7.5 per cent died of tuberculosis, whereas, of sixty-six infants who were left with their tuberculous parents, 82 per cent died during the next four years. Sutherland concludes that the contacts of every case of pulmonary tuberculosis should be tested with tuberculin and that all children found to be infected should be immunized with BCG or with tuberculin. Many physicians will wholly disagree with such a conclusion, since BCG sensitizes the tissues to tuberculoprotein, since some excellent bacteriologists have shown that it is capable of regaining its virulence, and since almost nothing is known about its possible remote dangers. Many will agree that the use of tuberculin may be of value to desensitize such children but will question whether it has any immunizing effect. Attention is also called to the fact that for a long time it has been known that certain individuals react negatively to the tuberculin test, although tuberculosis is present. However, the number apparently is not large and the explanation of the discrepancy usually is easy. The intracutaneous test of Mantoux is discussed at some length, with a careful description of the technic of administration, preparation of dilutions, and interpretation of reactions. Sutherland looks on this as the most accurate of all the cutaneous tests. However, he is not entirely in sympathy with the substitution of purified protein derivative for old tuberculin. A good many workers will disagree with recommendations concerning the subcutaneous test, as well as statements concerning tuberculin treatment, except when tuberculin is used to desensitize the tissues. This book presents much valuable information regarding the use of tuberculin and is worthy of careful reading by every physician.

Thérapeutique médicale, IX: Maladies infectieuses et parasitaires. Par M. Loeper, avec la collaboration de R. Turpin et al. Paper. Price, 50 francs. Pp. 415. Paris: Masson & Cie, 1935.

The first part of this ninth and last volume of Thérapeutique médicale deals with general therapeutics. It includes chapters on vaccination, serotherapy, bacteriotherapy, chemotherapy, protein therapy and hemotherapy. The second part, special therapeutics, contains articles on disinfection (L. Tanon), treatment of dysenteries (M. Dopter), prevention and cure of tetanus (L. Bazy), treatment and prevention of influenza—"la grippe"—(R. Dujarric de la Rivière), general principles of treatment of malaria (P. Abrami), bismuth treatment and bismuth prevention of syphilis (C. Levaditi), antityphoid vaccination (A. Lemierre), inoculation against diphtheria with Ramon's antitoxin (R. Debré), vaccine therapy against diseases caused by filtrable viruses (A. Pettit), convalescent serums (P. Joannon), and treatment with vitamins in infectious diseases (E. Lesné). The book does not give a systematic discussion of the treatment of infectious diseases but presents a series of articles on selected topics with special reference to serums, vaccines and chemotherapy. Some of the articles are rather fragmentary. The only article provided with references to the literature is that by Levaditi on bismuth in the cure as well as prevention of syphilis. As a rule the tendency of the articles is conservative. The oral ingestion of antityphoid vaccine is held to be of such doubtful value that it is not recommended for practical use. In the article on prevention of diphtheria, no mention is made of the one dose method with alum precipitated diphtheria toxoid. The book does not contain any account of the treatment of scarlet fever with specific antitoxic serum or of its prevention by the injection of susceptible persons with the toxin of the scarlet fever streptococcus. There is no index—only a short general table of contents.

A Textbook of Obstetrics for Students and Practitioners. By Frederick C. Irving, A.B., M.D., F.A.C.S., William Lambert Richardson Professor of Obstetrics, Harvard University Medical School. Cloth. Price, $6. Pp. 558, with 357 illustrations. New York: Macmillan Company, 1936.

This is an extensive elaboration of outlines used in the teaching of students in the Harvard Medical School. The author purposely avoided making the book embrace the entire field of obstetrics. All the illustrations except the reproductions of roentgenograms are simple drawings. Many have been reproduced from other textbooks. All except the roentgenograms are clear and instructive. The book is divided into the conventional chapters. The analgesic which the author prefers is pentobarbital in combination with scopolamine. In the discussion of postpartum care the impression is given that the examinations made six weeks post partum is the final contact between the physician and an obstetric patient. This is unfortunate, because women who have given birth should not be discharged when the baby is 6 or 8 weeks of age but should be seen at least twice more during the first year following confinement and if possible once a year thereafter. Septic abortion is treated conservatively at the Boston Lying-in Hospital, just as it is in most large clinics in this country. In the treatment of placenta praevia a low maternal mortality has been secured by conservative means; but, because the fetal death rate has been high, the author has decided to be more liberal in his indications for cesarean section provided the risk to the mother is not thereby increased. In some large clinics, such as those of De Lee and Bill, large series of cesarean sections have been performed for placenta praevia with low maternal and relatively low fetal death rates. Irving also favors conservatism in the treatment of premature separation of the placenta. He divides the toxemias of late pregnancy into preeclampsia and eclampsia and advocates conservative therapy for both conditions. At the Boston Lying-in Hospital, three types of cesarean section are performed: the classic, the lower segment and the extraperitoneal. The death rate from all causes among 1,025 such operations was 3.7 per cent. The book is well written and is based chiefly on the author's extensive experience as an obstetrician and teacher. Students and practitioners should find this book helpful.

Gynæcology for Students and Practitioners. By T. Watts Eden, M.D., C.M., F.R.C.P., Consulting Gynæcologist, Charing Cross Hospital and Chelsea Hospital for Women, and Cuthbert Lockyer, M.D., B.S., F.R.C.P., Consulting Gynæcologist, Charing Cross Hospital. Fourth edition. By H. Beckwith Whitehouse, M.B., M.S., Ch.M., Professor of Midwifery and Diseases of Women, University of Birmingham. Cloth. Pp. 964, with 655 illustrations. London: J. & A. Churchill, Ltd., 1935.

This heavy book of nearly a thousand pages is the fourth revision of gynecology originally written by Eden and Lockyer. It is now edited for the first time by H. Beckwith Whitehouse, who has brought it down to date not only by revision but also by rewriting several sections of the work, with the addition of considerable new material. This, and the profusion of illustrations, account for the size of the volume. The book is truly encyclopedic in its scope, being somewhat too complete, in fact, to be altogether readable. Some of its chapters are quite brisk in their style, however, and as a reference work it is admirable. Plates in color, half-tone drawings in black and white, line drawings by pen and ink, retouched photographs, and photomicrographs follow one another in such generous profusion that only a few pages lack one or the other in elaboration of the text. Many of these illustrations are excellent, but others are disappointing because they are apparently so old. The newer additions are by far the most satisfactory. The book is written and arranged in a style to which American readers are not entirely accustomed. The thoroughness with which the subject of gynecology is covered is characteristically British, although it is perhaps slightly bewildering to us in its meticulousness of detail. Whitehouse has added a timely section on the physiology of the female sex organs which is a companion to his chapters on functional disturbances and sterility. He has entirely rearranged the subject matter of the earlier editions by deliberately omitting as much as possible of symptoms and physical diagnostic signs from those portions of the book wherein he deals with etiology, clinical pathology, and the general nature of various gynecologic disorders. Then, toward the end of the book he groups and presents, rather uniquely, these previously deleted facts in an excellent section on gynecologic diagnosis and treatment. This is followed closely and logically by one on operative technic and another on postoperative treatment. Its having been edited and rewritten by a single authority has made possible the avoidance of the all too common faults of duplication and repetition. Its size is due solely to its being so comprehensive. The very completeness of this work recommends it as valuable to the library of the student, practitioner or specialist in gynecology.

Modern Ophthalmic Lenses and Optical Glass. By Theo. E. Obrig, A.B., Secretary, Gall & Lembke, Inc. Cloth. Price, $4.50. Pp. 323, with 168 illustrations. New York: The Author, 1935.

In the preface to this valuable little treatise the author says that "an effort has been made to present the subject matter in as simple and concise a manner as possible." He has succeeded admirably in fulfilling his task. The history and an acquaintance with the story of optical glass and eye glasses should be of interest not only to the ophthalmologist and his helper the optician but indeed to every lay person, for each must be aware of the fact that, around the age of 45 or before, spectacles are a necessity in counteracting the loss of accommodation which nature imposes on all human beings. The enormous amount of effort and expense consumed in bringing the crude sand to form a scientifically perfect lens is stressed by the author, thus giving a real insight into the whys and wherefores of the necessity for exactness and the cost of the finished product. The difficulty with becoming accustomed to the bifocal lens is thoroughly discussed, and each of the many types now in use has its advantages and disadvantages well presented. Those modern ocular instruments which have been evolved to aid persons with poor sight, such as the contact lenses, the telescopic spectacles and the iseikonic lenses to equalize the visual images of the two eyes, are considered in a manner most commendable. By directing attention to the protective lenses of color and those nonshatterable, the worker in hazardous occupations is apprised of the means at hand to prevent injury to the eye, which stands first in the list of causes of blindness. So too the worker in special fields in which it is desirable to have various focal distances because of the nature of the labor has demonstrated to him the value and defects of multifocal lenses. The means at hand to include prismatic effects in eye glasses to compensate for ocular muscle difficulties and thus overcome double vision, vertigo, dizziness and the like is set forth in a masterful manner. Proper emphasis of the adjustment of the properly made lens in its relation to its position with regard to the eye is elucidated. If any derogatory criticism is indicated, it is a fault in the illustrations, the figures in many being so small and indistinct as to be illegible. The "desire to present a short reference book which gives the elementary facts we should all know, about the history of glass, the manufacture of glass, colored lenses and the reasons for their need" has been carried out by the author in a thorough and simple manner.

Recent Advances in Cardiology. By Terence East, M.A., D.M., F.R.C.P., Physician, King's College Hospital, London, and Curtis Bain, M.C., D.M., M.R.C.P., Physician, Harrogate General Hospital. Third edition. Cloth. Price, $5. Pp. 350, with 99 illustrations. Philadelphia: P. Blakiston's Son & Co., Inc., 1936.

The first edition of this work appeared in 1929. In a sense the title is a misnomer. The volume is really a small textbook on cardiology largely made up of material so old that it cannot be classed as recent. This was also true of the second edition of 1931. The authors have, however, included a judicious selection from the newer facts concerning heart disease and in so doing have really rewritten the book. Two new chapters have been added, one on vascular diseases and one on congenital defects. The book can be recommended as a reliable, though by no means complete, work on disease of the heart, useful for the student who may be cramming for an examination or for the busy practitioner who wishes to brush up with a bird's-eye view of the subject. It is not, however, a work of reference or of study for one desiring thorough knowledge or who aims to qualify as a specialist in this field of practice.

Blutkörperchensenkung. Von Dr. Hans Reichel, Facharzt für innere Medizin, I. Med. Klinik in Wien. Unter Mitarbeit von Dr. P. Fasal et al. Paper. Price, 18 marks. Pp. 261, with 30 illustrations. Vienna: Julius Springer, 1936.

This textbook emanates from the First Medical Clinic of Vienna. It gives a complete story of the nonspecific test known as the blood sedimentation test. It shows the application of this test in diagnosis, prognosis and treatment. This is a complete account of the literature that has appeared in the last sixteen years. In addition, the author gives his experiences and conclusions based on a study of about 8,000 patients in the First Medical Clinic of Vienna, 3,000 of whom have been studied in the past year and a half. The technic of the method is completely set forth, together with its theory and physiology, and its bearing on general and experimental pathology, internal medicine, pediatrics, surgery, gynecology and obstetrics, skin, the sexual organs, the nervous system, ocular appearance, nose, throat and ear, as well as a special chapter on veterinary medicine, all of which tells the complete story of just how useful blood sedimentation is in medical practice. The author deserves great credit for assembling this literature and for having so painstakingly given his point of view based on an enormous personal experience. It is a valuable book for reference.

A Textbook of Roentgenology: The Roentgen Ray in Diagnosis and Treatment. By Bede J. Michael Harrison, M.B., Ch.M., D.M.R.E., Director of Department of Roentgenology, Vancouver General Hospital. Cloth. Price, $10. Pp. 826, with 238 illustrations. Baltimore: William Wood & Company, 1936.

In the introductory chapter the author announces that this book is addressed not to roentgenologists but to general clinicians and is intended primarily to enable the practitioner to understand the basis on which roentgenology rests, so that he may better comprehend its applications and limitations. To this end the author has striven to correlate morbid anatomy with roentgenology. Hence in the discussion of individual diseases the pathology is described first, and this is followed by a summary of the roentgenologic manifestations and the therapeutic effects of irradiation. Because the author's purpose, to which he has applied himself with obvious enthusiasm, is praiseworthy, and because clinicians can scarcely fail to profit from reading the volume, it is with reluctance that any adverse criticisms are offered. The chapters on the nature of roentgen evidence, on inflammation and on infection are excellent, but,

although the morbid anatomy of individual diseases is set forth with meticulous detail, the link with the roentgenologic phenomena is too often not pointed out specifically. Illustrative roentgenograms with analytic explanatory legends would have helped to show the link, but the number of illustrations is insufficient, legends are terse, and many common disorders are not illustrated at all. Especially regrettable are the incautious statements concerning the effectiveness of radiotherapy for certain disorders, such as gallstone colic, malfunctioning gastroenterostomy, traumatic epilepsy, and feeblemindedness in children, for few experienced radiologists would recommend irradiation for these conditions. Similarly, in some instances the criteria of diagnosis include items that are of doubtful validity. In short, the book seems to be a compilation of material drawn from many sources without the judicious discrimination that follows wide experience.

Études expérimentales récentes sur les maladies infectieuses. Par Jean Troisier, professeur agrégé de pathologie expérimentale et comparée à la Faculté de médecine de Paris. Paper. Price, 45 francs. Pp. 279, with 50 illustrations. Paris: Masson & Cie, 1935.

In the first part of this book the following diseases are grouped together because they appear to be caused by specific agents of as yet undetermined nature: fowl sarcoma (Rous), inguinal lymphogranuloma (in French maladie de Nicolas-Favre, lymphogranulomatose bénigne), yellow fever, influenza and coryza ("common cold"), vaccinal encephalitis and common jaundice (l'ictère commun). The second part includes spirochetosis icterohaemorrhagica and its meningeal variant, apparently a new nosologic entity first recognized and described by the author of this book and his associates (Troisier, Jean, and Boquien, Yves: La spirochetose méningée, Paris, Masson et Cie, 1933, reviewed in THE JOURNAL Sept. 2, 1933, p. 803), visceral leishmaniosis, and la fièvre buttonneuse, a typhus-like disease so far found mainly in the Mediterranean basin and caused by a form of Rickettsia. The third part takes up typhoid and paratyphoid fevers, tularemia, swine erysipelas, brucelliasis of bovine origin, tetanus, and gas bacillus (Clostridium Welchii) septicemia (in French septicémie à Bacillus perfringens). The next part reviews leprosy and certain forms of tuberculosis. The relations of human to rat leprosy are discussed in detail. The forms of tuberculosis considered are tuberculous infection by way of cutaneous inoculation and the septicemic form known in French as la typho-bacillose. The two remaining parts deal briefly with agranulocytosis and with "virus néphrotropes"—infectious agents of various kinds that have a special affinity for renal tissue. The illustrations are good. The style is clear and concise. Many authors are cited in the text without any reference being given to their publications. Of misspelled names may be noted Brill for Bull, Huddlesen for Huddleson, MacCoy for McCoy and Wallgreen for Wallgren. As usual in French books of this general type, there is no index—only a table of contents.

Twentieth Century Psychiatry: Its Contribution to Man's Knowledge of Himself. By William A. White, M.D., A.M., Sc.D. Cloth. Price, $2. Pp. 198. New York: W. W. Norton & Company, Inc., 1936.

This is the second Thomas W. Salmon memorial lecture to be published. It is divided into an introduction and three chapters on psychiatry as a medical specialty, the social significance of psychiatry and the general implications of psychiatric thought. In the introduction the author discusses and describes the history of psychiatry from the time of Pinel. He feels that practically all the changes in our ideas regarding psychiatry have occurred in the last fifty years. In the first chapter he discusses psychoanalysis and mental hygiene. He pleads for more research and constructive criticism for psychoanalysis. In the second chapter he discusses the social aspect and significance of mental disease in relation to federal and state budgets, relations of the individual to his community, and the social significance of his conduct and mental disorder. In the third chapter he emphasizes the tremendous growth of science during the present century and the extent to which psychiatric thinking has developed and become amalgamated with the advances in thought in all directions which directly or indirectly affect man and his activities. This is a popular publication and is recommended to all neuropsychiatrists. The author mentions about twenty-five books and publications used for references.

Principles and Practice of Preventive Medicine. Edited by C. W. Hutt, M.A., M.D., M.R.C.P., and H. Hyslop Thomson, M.D., D.P.H., Medical Officer of Health for the County of Hertford. In two volumes. Cloth. Price, £3 13s. 6d. Pp. 1,688, with 215 illustrations. London: Methuen & Co., Ltd., 1935.

In presenting these volumes Dr. Thomson calls attention to the untimely death of Dr. C. W. Hutt, who died while the book was going through the press. The two volumes constitute a system of preventive medicine to which many leading authorities of Great Britain have contributed. The first volume is concerned with prevention of infections, the control of insects and vermin, and the hygienic problems involved in the control of food and water supplies. It concludes with a chapter on the disposal of the dead. The second volume proceeds to consider such topics as air, climate, housing, ventilation, lighting, smoking, maternal and infant welfare, industrial medicine, the hygiene of aviation, popular education in health, and many other modern topics. Although the books are peculiarly British in their approach to the subjects concerned, they advance many interesting suggestions for American and other readers. There is an extensive index which makes easy consultation of this valuable reference work on many hundreds of topics. The scope of the work is an indication of the tremendous advance that has taken place in preventive medicine during the past fifty years. The publishers have done a magnificent job of printing, using a thin enameled stock which lends itself beautifully to illustration and which permits a great number of pages of information in a small bulk. It is not possible in the scope of a review such as this to consider item by item the great field covered. The repute of the editors and of the individual authors is sufficient indication of the reliability of the material.

The Mayo Clinic. By Lucy Wilder. Cloth. Pp. 82, with illustrations by Ruth Barney. Rochester, Minnesota: The Author, 1936.

This volume is obviously published *con amore* about the origin, growth, development and present status of the Mayo Clinic. The book is the work of Lucy Wilder, wife of Dr. Russell M. Wilder. It is artistically designed with drawings and maps, artistically developed pages with inset sketches, and for any one who has been to the Mayo Clinic or who wishes to know in brief about it a useful book as well as a pleasing memento. The story of the Mayo Clinic is given in three chapters entitled "The Past," "The Future" and "The Present," and the volume concludes with the letter from Dr. William J. Mayo to the University of Minnesota establishing the Foundation—a document which is already historically epoch making because of its purpose and its statement of the aims of wealth.

Proceedings of the National Conference of Social Work [Formerly National Conference of Charities and Correction] at the Sixty-Second Annual Session Held in Montreal, Canada, June 9-15, 1935. Cloth. Price, $3. Pp. 748. Chicago: The University of Chicago Press, 1935.

The papers presented at this conference show an almost complete transformation in social work and its treatment during recent years. The discussion of broad social problems now takes a prominent place. Even the technical discussions center around recent legislation, such as the Social Security Act and emergency relief measures. Much attention is given to "group work" and its relation to problems of social change. H. M. Cassidy, director of social welfare for British Columbia, describes the newly adopted system of health insurance in British Columbia. In the papers dealing with medical social work the necessity of medical leadership is stressed, something often overlooked in carrying out recent health programs.

Elementary Bacteriology. By Joseph E. Greaves, M.S., Ph.D., Professor of Bacteriology, Utah Agricultural College, Logan, and Ethelyn O. Greaves, M.S., Ph.D. Third edition. Cloth. Price, $3.50. Pp. 562, with 147 illustrations. Philadelphia & London: W. B. Saunders Company, 1936.

This was written to furnish a suitable textbook for courses in elementary bacteriology. The hope that it might also prove of interest to nurses, home demonstrators, agricultural and home economic workers and to an ever increasing multitude of readers who are turning from fiction to facts was also expressed. It is simply and entertainingly written. At times the intention of writing simply and entertainingly has led to a somewhat careless method of expression, such as the reference to "T. B." in the introduction. The book would scarcely serve as a text-

book for medical students, but most of it could be read easily by intelligent persons without special scientific training. It might also serve as a useful addition to other textbooks in college courses of general bacteriology. The index is not complete, especially with regard to the authors referred to in the text. It would be helpful in later editions to improve this index. The chapters on milk and milk products, the nitrogen cycle and the carbon cycle are especially interesting. The classification of bacteria is rather too complicated for the rest of the book and its probable readers.

Kolloid-Fibel für Mediziner. Von Dr. Dr. Raphael Ed Liesegang, Institut für Physikalische Grundlagen der Medizin, Frankfurt a. M. Paper. Price, 1 mark. Pp. 34. Dresden & Leipzig: Theodor Steinkopff, 1936.

This "Colloid Primer" by one of the foremost authorities on colloids, shows that it takes a master to present a complex subject simply. He chiefly intends this "primer" as a stimulus to the reading of more extensive books. While the reading of this book can be chiefly recommended to one to whom this field is new, its perusal will pay the teacher, as it will enrich his vocabulary with helpful metaphors and similes. "Protective colloid" is "likened to a defensive armor." Soap acts by "one end of its long molecule projecting into the oil (the disperse phase) and the other end sticking out into the water." Each cell is "a mosaic of somewhat more acid and mere alkaline places" and its "membrane, a mosaic of lipoids and of water swelled protein, so that it is permeable to both."

Miscellany

OXYGEN ADMINISTRATION

The Committee on Public Health Relations of the New York Academy of Medicine was requested to prepare a memorandum with information concerning the administration of oxygen. The need for this, according to the request, arose from the fact that there are on the market oxygen tents which are not only inadequate but may be a source of actual danger to the patient.

Evidence has come to hand which indicates that oxygen therapy is frequently administered in a wasteful and ineffective manner not only in private practice but also in the wards of hospitals.

REGULATION OF OXYGEN CONCENTRATION

The purpose of oxygen therapy is to overcome oxygen want due to some interference with proper oxygenation of the blood, as in pneumonia, coronary thrombosis, congestive heart failure, emphysema or atelectasis. In the presence of fever the metabolism is increased and the oxygen want is thereby increased. If the patient is to be benefited, the amount and concentration of the oxygen employed must be sufficient to compensate for the impairment in the oxygen exchange. It is important that the physician prescribe definitely the concentration of oxygen to be breathed by the patient, just as he prescribes the dose of drugs. The optimum range of oxygen concentration will vary in different patients. In some cases 30 per cent will be adequate to correct the deficiency; in other instances as high as 70 per cent may be required. Continuous use of pure oxygen is harmful, but for periods not exceeding eight hours of the twenty-four a concentration as high as 90 per cent has been found safe. In many cases from 45 to 50 per cent is the most desirable concentration.

A 35 per cent concentration of oxygen in the alveolar air may be achieved by means of a forked nasal tube inhaler or a simple nasal catheter and an oxygen flow of 5 liters per minute. By increasing the flow, even higher concentrations may be obtained. The administration of concentrations between 50 and 70 per cent is in most instances more satisfactorily obtained by the employment of an oxygen tent. The tent also permits air conditioning.

TESTING THE OXYGEN TENT PERIODICALLY

If the tent is to fulfil its purpose, it must be able to maintain the desired oxygen concentration. The possibility of leaks developing in the unit is so great that no tent should ever be used unless its oxygen content is tested at least two to three times a day and the results of the test recorded. The testing is so simple and yet so essential that no physician should ever employ a tent in his private or hospital practice unless provision is made for periodic testing of the oxygen concentration. This test should not be made immediately after the tent has been filled with oxygen. If the circulation is directly through the ice it takes an hour for the concentration of oxygen to be restored to its former height, unless after the icebox is opened the flow rate of oxygen is increased temporarily. The blower should be stopped when ice is added or inspected.

OXYGEN TENT THERAPY FOR ADULTS

In addition, three other important conditions must be met. 1. For adults a tent should have a capacity of at least 8 cubic feet. 2. The temperature inside the tent should be maintainable at the desired temperature by means of a cooling device. In most patients with fever a temperature between 58 and 68 F. is preferred in winter and a slightly higher temperature in summer. Higher temperatures are often desirable for older people and infants. 3. The relative humidity should be maintained between 40 and 60 per cent. When tents are ventilated by a motor blower circulation which passes the air over a cooling medium such as ice, the humidity will usually be within this range. If the temperature and humidity are not maintained at these comfort levels, the patient will be distressed and the tent will do much more harm than good. The nurse should be instructed to observe and record the temperature within the tent throughout the day and night, or the temperature and humidity may be recorded by an automatic recording device. If the temperature goes above 70 F. it generally indicates that there is inadequate cooling and frequently inadequate removal of moisture. This may be due to inadequate circulation of air or inadequate provision for cooling.

The carbon dioxide content should not be more than 1.2 per cent. If a minimum flow of 8 liters of oxygen per minute and an oxygen concentration of 50 per cent are maintained, harmful accumulations of carbon dioxide within the tent will not take place even in the absence of soda lime. If lesser rates of oxygen flow and higher concentrations of oxygen are maintained especially for adults with fever, soda lime should be used. Because there is no valid indication for continuous stimulation of the respiratory center, mixtures of carbon dioxide and oxygen are not required for most illnesses. For short periods, such stimulation may be of value in such conditions as carbon monoxide poisoning, drowning, electrical shock, atelectasis of the newborn, and when there is shallow breathing.

Tents which are not equipped with a satisfactory method for cooling and drying the air may be detrimental to the patient and may cause death by heat stroke. No closed canopy should be put over a patient's head unless it is equipped with a cooling and dehumidifying apparatus. Tents without blowers are unsatisfactory in certain climatic regions.

OXYGEN TENT THERAPY FOR INFANTS

The same general principles apply to tents for infants, except that higher temperatures, and in some instances higher humidities, should be prescribed for very small infants. Smaller tents may be used. It is dangerous to deprive infants of heat by rapidly circulating cool air over them. A tent with an aperture at the top, and to which the oxygen is admitted at the base, may be used provided it is not placed near an open window or door where air currents may draw out the accumulated oxygen. The oxygen concentration should be tested and recorded. An umbrella or canopy tent without an air conditioner may be used for infants under 2 months of age, since such infants produce insufficient heat, water or carbon dioxide to permit harmful accumulation of these metabolites.

STERILIZATION OF THE TENTS

All tents should be sterilized after each use by scrubbing inside as well as outside with soap and water. The tents should therefore be made of double-faced material. After scrubbing, the tent should be dipped in a solution of 1:10,000 mercury bichloride for five minutes. To prevent incrustation, the tent should be washed down with water after immersion in the mercury bichloride. In hospital practice an alternate method would be the dipping of the tent in a 70 per cent solution of ethyl alcohol for five minutes.

FIRE HAZARDS

1. All tents should be conspicuously stamped "No Flames, No Sparks, Danger."

2. Oxygen gages should be conspicuously labeled "Danger, Do Not Oil."

3. For the window of the tent, only cellulose acetate or other noninflammable material may be employed. Cellulose nitrate or celluloid should never be used because they are extremely inflammable and form dangerous fumes.

NASAL CATHETER OR NASAL TUBE ADMINISTRATION

There are several effective methods of administering oxygen through the nose, employing a nasal catheter or nasal tube inhaler with a calibrated gage to fit on a high pressure tank. The oxygen must be passed through at least 3 inches of water to prevent drying the mucous membrane.

1. A metal nasal tube inhaler with soft rubber tips that just enter each nostril may be employed.

2. A nasal catheter may be inserted into the nostril for a distance of approximately 3 inches; i. e., up to but not touching the posterior wall of the nasopharynx. Five liters of oxygen generally provides 35 per cent oxygen in the inspired air. A single catheter may be changed from one nostril to the other if irritation should occur. With a double nasal catheter a slightly increased oxygen concentration is obtained at the same rate of flow. The terminal one inch of the catheter should be perforated with four holes in order to prevent a stream of oxygen impinging on one localized area of mucous membrane. The size of the catheter may be a No. 12 French or a somewhat larger caliber if it does not occlude the nasal passage completely.

3. The catheter may be employed in the oropharynx opposite the uvula. When it is used in this position, caution must be exercised lest oxygen be passed into the stomach. The catheter should not be placed lower than the uvula. The throat should be sprayed every eight to twelve hours to prevent drying.

Whereas 4 or 5 liters per minute of oxygen is generally used with the nasal catheter or nasal tube inhaler, higher rates of flow up to 12 liters per minute may be employed if no sensation of discomfort is produced. With the higher rates of flow, larger catheters are required. When catheters are employed it is important to make additional holes in the terminal one inch.

OXYGEN REGULATOR AND GAGE

Oxygen should be employed in high pressure tanks containing 220 cubic feet, or 6,000 liters. There is only one kind of oxygen, industrial oxygen. There is no special "medical" oxygen.

The flow regulator should have two gages, one to indicate the amount of oxygen in the cylinder, and the other to indicate the rate of flow in liters per minute. A variable orifice or float gage indicates the amount of oxygen actually flowing and is accordingly to be preferred to a dial gage which records the pressure against a fixed orifice as liters per minute. The latter type does not indicate that the oxygen flow may have stopped or has been diminished. Bourdon tube type gages, as well as the pitot tube type gages, should be tested from time to time by measuring the rate at which the spirometer of a metabolism apparatus is filled at standard pressure and temperature.

CONCLUSIONS

This statement emphasizes:

1. The effectiveness of the nasal inhaler or nasal catheter.

2. The value of a tent for administering high concentrations of oxygen.

3. The desirability of prescription by the physician of the concentration of oxygen in the oxygen tent.

4. The necessity for repeatedly testing and recording the oxygen concentration within the tent.

5. The necessity for observing the temperature and humidity constantly while the tent is in use.

6. The danger to life involved in employing a tent in which an optimum oxygen concentration is not maintained and in which the temperature and humidity are not observed and controlled.

April 6, 1936.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Chiropractic: Injections for Cancer Illegal; Scope of Chiropractic in California.—Hartman, a licensed chiropractor in California, was convicted in the justice's court of San Bernardino township, on a complaint charging him with, among other things, (1) the unlawful possession of a hypodermic syringe and needle in violation of sec. 8 (e) of the poison act,[1] and (2) a violation of the medical practice act by practicing medicine without a license. The case was submitted on an agreed statement of facts. Thereafter Hartman appealed to the superior court which affirmed the judgment of conviction, and Hartman made application for a writ of habeas corpus to the district court of appeal, fourth district, California.

In the agreed statement of facts, Hartman admitted that he had in his possession a hypodermic syringe and that he treated cancer "according to the 'Koch' method, by injection of a fluid called 'antitoxin' or split-protein." It was agreed that this method of treating cancer was taught in chiropractic schools and colleges in the state. Hartman contended that his method of practice was authorized by sec. 7 of the chiropractic act of California, which authorizes a licentiate—

> to practice chiropractic in the state of California as taught in chiropractic schools or colleges; and, also, to use all necessary mechanical, and hygienic and sanitary measures incident to the care of the body, but shall not authorize the practice of medicine, surgery, osteopathy, dentistry, or optometry, nor the use of any drug or medicine now or hereafter included in materia medica.

The contention was that since the use of the hypodermic syringe and needle and the diagnosis and treatment of cancer by the use of an injection of "antitoxin" were taught in chiropractic schools in California, Hartman was practicing within lawful limits. He further sought to justify the use of the hypodermic syringe by contending that it was merely a measure "incident to the care of the body." The use of the hypodermic syringe, said the district court, cannot be held to be merely a measure "incident to the care of the body," within the meaning of the chiropractic act, because the phrase "incident to the care of the body" refers to general hygienic and sanitary measures, even though mechanical, and not to the treatment of diseases and ailments, and because of the limitations imposed that licentiates shall not be authorized to practice medicine or surgery. The section dealing with the authorized scope of chiropractic must be read as a whole. It cannot be construed as authorizing a licentiate to do anything and everything that might be taught in a chiropractic school. A short course in surgery, or one in law, might be given, but it would not follow that a licensed chiropractor might engage in such other professions. It is not sufficient that a particular practice be taught in a chiropractic school; the practice must constitute a part of chiropractic and must not violate the provision expressly forbidding licentiates from practicing medicine. If a particular practice is not a part of chiropractic, but does constitute the practice of medicine, a chiropractic licentiate may not engage therein, even though it may be taught in a chiropractic school.

The court was unable, however, to determine from the agreed statement of facts whether the method of treatment here in question was or was not a part of the practice of chiropractic. The failure of the petitioner, Hartman, to include in the record that was before the district court all the evidence made it impossible for that court to pass on the sufficiency of it. Furthermore, the rule is well established that the sufficiency of the evidence may not be reviewed in a habeas corpus proceeding. Even if we could properly review the evidence, the court said, there was none in the record which would support a finding that the use of a hypodermic needle or the injection of an "antitoxin" is a part of chiropractic, and no evidence

1. This section provides, in part, that it shall be unlawful for any person other than a physician and surgeon, dentist, registered nurse, veterinarian, or pharmacist licensed to practice in California to have in his possession a hypodermic syringe unless it was purchased on a written order signed by a duly licensed physican, dentist, or veterinarian or by a person holding an unrevoked license to practice osteopathy.

that such forms of treatment do not constitute the practice of medicine. The court held, therefore, that the petitioner was not entitled to be released from custody. *In re Hartman (Calif.), 51 P. (2d) 1104.*

Malpractice: Chiropractor's Malpractice Provable Without Expert Testimony.—The plaintiff consulted the defendant, a chiropractor, relative to pains in her face. The defendant diagnosed her condition as "tic douloureux, inflammation of the fifth cranial nerve." Although this nerve is in no way connected with any portion of the vertebrae, the chiropractor, during the course of treatment of the patient's ailment, fractured her twelfth rib while adjusting her vertebrae in that region. The patient sued the chiropractor, and the trial court, sitting without a jury, entered a judgment in her favor. The chiropractor then appealed to the district court of appeal, second district, division 2, California.

The sole question before the court was: In case a chiropractor has prescribed treatment for a specific ailment and injures an undiseased portion of his patient's body in no way related to the ailment, may the court, in the absence of expert testimony, properly find that the chiropractor negligently injured his patient? The negligence of a chiropractor, said the district court of appeal, in failing to take due care to avoid injury to undiseased parts of his patient's body may be proved without resorting to expert testimony. The finding of the trial court, based on substantial evidence other than expert testimony, that the patient suffered injuries to an undiseased portion of her body as the result of the defendant's negligence was held to be binding on the appellate court.

The judgment in favor of the patient was therefore affirmed. —*Morrison v. Lane (Calif.), 52 P. (2d) 530.*

Health Insurance: Total Permanent Disability Defined.—"Total disability," said the Court of Appeals of Kentucky, does not mean utter helplessness and "permanent disability" does not mean utter hopelessness. A man to be totally and permanently disabled does not have to be reduced to a state wherein he is entirely dependent on others and is absolutely without hope of improvement. In *McNally* v. *United States,* 52 Fed. (2d) 440, the United States circuit court of appeals, in defining the term "total permanent disability," said that it does not mean "absolute incapacity" but such "impairment of capacity as to render it impossible for the disabled person to follow continuously any substantially gainful occupation." In the present case the insured, 60 years of age and suffering from heart disease, was held to be totally and permanently disabled, although he attempted to obtain work and actually did work for about twenty days during a period of two years. The sacrifices some men will make, the dangers they will undergo to feed their families, are, said the Court of Appeals, often beyond comprehension. In determining the rights of men, however, the standard of unusual examples should not be used. What the average reasonable man would do under the circumstances is the criterion.—*Aetna Life Ins. Co. v. Gullett (Ky.), 89 S. W. (2d) 1.*

Hospitals, in General: Admissibility of Records in Evidence.—Plaintiff sued the defendant to recover damages for personal injuries sustained in an automobile accident. At the trial, the court refused to admit in evidence, at the request of the defendant, the hospital records of the plaintiff. The jury returned a verdict for the plaintiff and the defendant appealed to the Supreme Court of New Hampshire, contending that the trial court erred in declaring inadmissible in evidence the hospital records.

Although a liberal rule in regard to the admissibility of entries made in the regular course of business prevails in New Hampshire, said the court, some proof of correctness is required before such entries can properly be submitted to a jury. Ordinarily, verification of the authenticity, regularity and correctness of such records by the official having them in charge would be the minimum of acceptable proof. Whether a record is sufficiently verified to justify its admission, however, is a preliminary question of fact for the trial judge to pass on. In the present case, the records were produced by a nurse who testified that she did not have the custody of the official records of the hospital "except in the absence of the superintendent." She disclosed no knowledge as to the system or method in accordance with which the hospital records were kept, as to the identity of the persons who made the records in question or the duties of such persons with respect to the recording of facts therein. In short, said the court, no one testified that the records were correct. In view of these facts, in the opinion of the Supreme Court, the trial court committed no error in ruling that the records were inadmissible in evidence. A judgment was therefore rendered on the verdict for the plaintiff.—*Williams v. Williams (N. H.), 182 A. 172.*

Workmen's Compensation Act: Death from Botulism Compensable.—Meyer was employed by the defendant Roettele to assist in operating a threshing machine, for which services he received daily wages and board. As a result of the ingestion of a noonday meal, Meyer became ill from botulism and died three days later. The claimants, the parents of Meyer, filed a claim under the workmen's compensation act of South Dakota and the commissioner awarded compensation. This award was affirmed by the circuit court, and the defendants appealed to the Supreme Court of South Dakota.

The workmen's compensation act of South Dakota authorizes an award of compensation "for personal injury or death by accident arising out of and in the course of employment." "Personal injury" is defined specifically to exclude "a disease in any form except as it shall result from the injury." The defendants contended that Meyer's death was due to a disease and that compensation for disease may be awarded only in case the disease is produced or aggravated by an injury caused by an unexpected event. The phrase "injury by accident," the defendants contended, should be construed so as to confine its application to instances in which the cause of the injury was accidental. A disease, said the court, may be an "injury by accident" and therefore compensable. If the element of suddenness or precipitance is present and the disease is not the ordinary or reasonably to be anticipated result of pursuing an occupation, it may be regarded as an injury by accident. The medical testimony was to the effect that the food poisoning and resulting death were caused not by the action of bacteria within the body but by a toxin created by the action of Bacillus botulinus on the food before it was ingested. There is no substantial distinction, the court said, between the consuming of this poisonous food and chemical poisoning or the drinking of a virulent poison by mistake. The inception of the disease was attributable to the unexpected and undesigned occurrence of the presence of the poisonous toxin and was assignable to a definite time, place and circumstance. The death was, therefore, the result of an "accidental injury." The mere fact, said the court, that an employee is not actually engaged at his work at the time of injury does not relieve the employer of liability. Under the terms of employment, in the instant case, board was furnished. Meyer was where his employer directed him to be, and, although the partaking of food was personal in character, nevertheless it was so incident to his employment that the accident arose out of and in the course of employment.

In the opinion of the court, however, the award was excessive. The judgment was therefore reversed and the case remanded with directions to enter judgment for the claimants for a lesser amount.—*Meyer v. Roettele (S. D.), 264 N. W. 191.*

Society Proceedings

COMING MEETINGS

American Physiotherapy Association, Los Angeles, June 28-July 2. Miss Jefferson I. Brown, Tichenor Hospital School, Long Beach, Calif., Secretary.

Conference of State and Provincial Health Authorities of North America, Vancouver, B. C., June 22-24. Dr. A. J. Chesley, State Department of Health, St. Paul, Minn., Secretary.

Maine Medical Association, Rangeley, June 21-23. Miss Rebekah Gardner, 22 Arsenal St., Portland, Secretary.

Medical Library Association, St. Paul, June 22-24. Miss Janet Doe, 2 E. 103d St., New York, Secretary.

Montana, Medical Association of, Billings, July 8-9. Dr. E. G. Balsam, 208½ North Broadway, Billings, Secretary.

North Pacific Pediatric Society, Victoria, B. C., June 24-25. Dr. M. L. Bridgeman, 1020 S. W. Taylor St., Portland, Ore., Secretary.

Pacific Northwest Medical Association, Portland, Ore., July 8-11. Dr. C. W. Countryman, 407 Riverside Avenue, Spokane, Wash., Executive Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL in continental United States and Canada for a period of three days. Periodicals are available from 1926 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American J. Digestive Diseases and Nutrition, Chicago

3: 83-148 (April) 1936

Relation in Man Between Gastric Acidity and Height and Weight. Frances R. Vanzant, W. C. Alvarez and J. Berkson, Rochester, Minn. —p. 83.

*New Clinical Concepts of Bacillary Dysentery: Its Relationship to Nonspecific Ulcerative Colitis, Distal Ileitis and Nonspecific Granuloma. J. Felsen, New York.—p. 86.

Studies on Constitution and Peptic Ulcer: I. Appetite Secretion in Normal Persons and in Ulcer Patients. H. Necheles and M. H. Maskin, Chicago.—p. 90.

Id.: II. Dermographic Time of Peptic Ulcer Patients and Normal Subjects. H. Necheles, M. H. Maskin and J. Meyer, Chicago.—p. 92.

Study of Effect of Anoxemia on Pyloric Sphincter in Unanesthetized Dogs. E. J. Van Liere and J. E. Thomas, Morgantown, W. Va., and Philadelphia.—p. 94.

Studies of Pepsin in Human Gastric Juice: IV. Influence of Gastric and Duodenal Disease. Frances R. Vanzant, A. E. Osterberg, W. C. Alvarez and A. B. Rivers, Rochester, Minn.—p. 97.

Id.: V. Its Prognostic Value. Frances R. Vanzant, A. E. Osterberg, W. C. Alvarez, E. S. Judd and A. B. Rivers, Rochester, Minn.—p. 101.

Effects on Gastric Juice of Man of Six Weeks' Deprivation of Vitamin B_1. W. C. Alvarez, F. Pilcher, Mary A. Foley, Annette Mayer and A. E. Osterberg, Rochester, Minn.—p. 102.

Roentgenographic Studies of Mucous Membrane of Colon: I. Normal Pattern. F. J. Lust and H. G. Jacobi, New York.—p. 108.

Aluminum Hydroxide as Antacid in Peptic Ulcer. W. L. Adams, I. H. Einsel and V. C. Myers, Cleveland.—p. 112.

Diverticula of Jejunum: Report of Four Cases. T. J. Jones and G. Crile Jr., Cleveland.—p. 120.

Ischiorectal Abscess: Stage in Development of "Horseshoe" Fistula: Case Report. G. M. Landrock, Philadelphia.—p. 122.

Relationship of Bacillary Dysentery to Colitis, Ileitis and Granuloma.—Felsen wishes to show that acute bacillary dysentery, acute distal ileitis, chronic nonspecific ulcerative colitis, ileitis and nonspecific granuloma are but different stages of the same disease. He bases his data on a study of 317 cases of acute bacillary dysentery, eleven cases of acute distal ileitis, forty-two consecutive cases of nonspecific ulcerative colitis, eight with chronic distal ileitis, four with pseudopolyposis and two cases of nonspecific granuloma of the ileocecal region. Most of his patients with acute bacillary dysentery recovered completely in from ten days to two weeks. Acute distal ileitis appeared to subside, but in some cases the intestinal lesion persisted. Cases of acute bacillary dysentery lasting for more than three weeks appeared to persist by reason of a secondary nonspecific infection. Contact infection was demonstrated in six cases of nonspecific ulcerative colitis, suggesting that nonspecific ulcerative colitis is transmitted only during the initial stage of acute bacillary dysentery. In forty-two consecutive cases of nonspecific ulcerative colitis a diagnostic agglutination titer against Bacillus dysenteriae was obtained. A pathologic study was made of seven specimens of acute bacillary dysentery, eleven of acute distal ileitis, six of chronic distal ileitis, two of nonspecific granuloma and seven of nonspecific ulcerative colitis. The lesions in the chronic stage were identical with those seen in acute bacillary dysentery except that, owing to the long duration of the disease, extensive fibrosis and intramural infection were present. The former represented an attempt at healing and accounted for the loss of haustration and stenosis seen in chronic distal ileitis and nonspecific ulcerative colitis. Nonspecific granuloma of the ileocecal region represents a productive type of inflammation and, like chronic distal ileitis, almost always shows giant cells in the tissue sections. This condition may be erroneously diagnosed as tuberculosis, but tubercle bacilli are absent and guinea-pig inoculation of the macerated tissue proves negative. While no case of amebic dysentery has been included in this study, it appears to the author that the same type of secondary nonspecific infection might occur. The ideal treatment of nonspecific ulcerative colitis and its related lesions appears to be the prevention of bacillary dysentery. Recognition of the typical and atypical forms of the disease, prompt isolation and careful epidemiologic surveys should lessen the incidence of the diseases known as nonspecific ulcerative colitis, chronic distal ileitis and nonspecific granuloma. Every patient with diarrhea or a history of diarrhea should be placed on typhoid precautions until proved free of Bacillus dysenteriae. Most patients with acute bacillary dysentery recover without any specific therapy. Supportive treatment may be used when indicated. The use of recently recovered cases as donors is suggested in the acute severe types of the disease. All patients with acute bacillary dysentery in whom the intestinal lesions persist for more than three weeks should be placed immediately on prophylactic D-C vaccine and antivirus therapy. In sporadic or epidemic outbreaks the widespread use of polyvalent dysentery vaccine should afford some degree of immunity before the patient becomes infected. This observation is based on a limited experience with human contacts and experimental animals. Some cases of nonspecific ulcerative colitis heal spontaneously, but most of them go on for years with periodic stages of remission and exacerbation. All that one can hope for in a case of long duration is subsidence of the infection. Toward this end the author uses the following therapy: (1) intestinal oxygenation, (2) D-C vaccine and (3) D-C antivirus. The organisms in the vaccine and antivirus include polyvalent strains of the specific dysentery (D) organism with which the patient was originally infected as demonstrated by the agglutination titer, and the two common secondary invaders, enterococcus and Bacillus coli (C). The vaccine and antivirus are administered every other day, the former in gradually increasing dosage after a preliminary skin test for sensitivity.

American Journal of Physiology, Baltimore

115: 249-496 (April 1) 1936. Partial Index

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Position of Oxygen Dissociation Curve of Human Blood at High Altitude. A. Keys, F. G. Hall and E. S. G. Barron, Chicago.—p. 292.

Action of Heparin and Its Relation to Thromboplastin. A. J. Quick, Milwaukee.—p. 317.

Electrolyte Changes in Muscle During Activity. W. O. Fenn and Doris M. Cobb, Rochester, N. Y.—p. 345.

Stellate Ganglions and Breathing. J. M. Brookhart, E. H. Steffensen and R. Gesell, Ann Arbor, Mich.—p. 357.

Creatinuria Induced by Ingestion of Glucose and Fructose and by Exercise. J. Haldi and G. Bachmann, with assistance of W. Wynn and J. M. Little, Emory University, Ga.—p. 364.

Effect of Progestin on the In Vitro Response of Rabbit's Uterus to Pituitrin. A. W. Makepeace, G. W. Corner and W. M. Allen, Rochester, N. Y.—p. 376.

Gastric Secretagogic Value of Various Digestive Secretions. M. S. Kim and A. C. Ivy, Chicago.—p. 386.

Reflex Pathways Concerned in Inhibition of Hunger Contractions by Intestinal Distention. J. Lalich, W. J. Meek and R. C. Herrin, Madison, Wis.—p. 410.

Metabolic Aspects of Thyroid Adrenal Interrelationship. S. B. Barker, J. F. Fazikas and H. E. Himwich, New Haven, Conn.—p. 415.

Specific Dynamic Action of Protein in Pancreatic Diabetes. G. C. Ring, Boston.—p. 419.

Source of Blood Acetone Resulting from Administration of Ketogenic Principle of Anterior Hypophysis. I. A. Mirsky, Cincinnati.—p. 424.

Inhibitory Influence of Acidity of Gastric Contents on Secretion of Acid by Stomach. C. M. Wilhelmj, F. T. O'Brien and F. C. Hill, Omaha. —p. 429.

Relation of Pregnancy and Lactation to Extirpation Diabetes in Dog. F. P. Cuthbert, A. C. Ivy, B. L. Isaacs and J. Gray, Chicago.—p. 480.

Cardiac Output in Standing Position.—Scott observed the cardiac output of a single individual in the recumbent, sitting and standing positions. During the winter season in the standing position high auriculoventricular differences are usually associated with high oxygen consumption; in the summer this relationship is reversed. The average standing cardiac output is lower than that of recumbent or sitting positions. The output is influenced by various undefined environmental factors under so-called basal conditions, particularly if the subject is standing.

American Journal of Tropical Medicine, Baltimore

16: 105-244 (March) 1936

Anopheles (Anopheles) Punctimacula Naturally Infected with Malaria Plasmodia. J. S. Simmons, Ancon, Canal Zone.—p. 105.
*A Fifth Year's Observations on Malaria in Panama, with Reference to the Failure of Atabrine to Control an Epidemic. W. H. W. Komp and H. C. Clark, Panama City, Republic of Panama.—p. 109.
Occurrence of Gametocytes of Plasmodium Vivax During Primary Attack. M. F. Boyd, W. K. Stratman-Thomas and H. Muench, Tallahassee, Fla.—p. 133.
Acquired Immunity to Plasmodium Falciparum. M. F. Boyd, W. K. Stratman-Thomas and S. F. Kitchen, Tallahassee, Fla.—p. 139.
Evidence of Binary Fission of Ring Forms in Plasmodium Vivax Grassi and Feletti. T. de Vinne Beach, New Orleans.—p. 147.
Duration of Infectiousness in Anophelines Harboring Plasmodium Falciparum. M. F. Boyd, W. K. Stratman-Thomas and S. F. Kitchen, Tallahassee, Fla.—p. 157.
Relative Susceptibility of the Inland and Coastal Varieties of Anopheles Crucians Wied. to Plasmodium Falciparum Welch. M. F. Boyd, S. F. Kitchen and J. A. Mulrennan, Tallahassee, Fla.—p. 159.
Further Studies on Transmission of Trypanosoma Hippicum Darling by Vampire Bat Desmodus Rotundus-Murinus Wagner. C. M. Johnson, Panama City, Republic of Panama.—p. 163.
Diendamoeba Fragilis: Cause of Illness: Report of Case. E. G. Hakansson, Panama City, Republic of Panama.—p. 175.
Distribution of American Leishmaniasis in Relation to That of Phlebotomus. G. C. Shattuck, Boston.—p. 187.
Chemotherapy of Dirofilaria Immitis. H. G. Johnstone, San Francisco.—p. 207.

Failure of Atabrine to Control an Epidemic of Malaria.—In presenting the observations made during the fifth consecutive year of studies on malaria in Panama, Komp and Clark state that none of the methods of treatment used in the preceding year were able to prevent or to check the course of an epidemic caused by subtertian parasites, which occurred during the first four months of 1935. This epidemic was a manifestation of the cyclic variations in malaria parasite rate which are characteristic of malaria in Panama. Increased knowledge of the local conditions has caused them to abandon the method used in the past, the attempt to reduce malaria incidence by treatment directed against the reservoir of malaria in young children and adolescents. They believe that more harm than good has been done by this method and that their objective to increase labor efficiency may be more easily obtained by treatment of clinical cases as they occur, atabrine being used as the drug of choice. Further evidence that a familial immunity to malaria may exist is presented, and, finally, some essential criteria which must be used in future experimental work are outlined.

Annals of Internal Medicine, Lancaster, Pa.

9: 1287-1452 (April) 1936

The Changing Order in Medicine. J. A. Miller, New York.—p. 1287.
Lymphopoiesis, Lymphatic Hyperplasia and Lymphemia: Fundamental Observations Concerning Pathologic Physiology and Interrelationships of Lymphatic Leukemia, Leukosarcoma and Lymphosarcoma. B. K. Wiseman, Columbus, Ohio.—p. 1303.
*Metabolism Studies in Myasthenia Gravis Before and During Administration of Glycine. Mildred Adams, M. H. Power and W. M. Boothby, Rochester, Minn.—p. 1330.
*Treatment of Addison's Disease with Sodium Compounds, with Report of One Case and Summaries of Eleven Other Collected Cases Thus Treated. E. C. Reifenstein and E. C. Reifenstein Jr., Syracuse, N. Y.—p. 1338.
*Leukocyte Picture in Hodgkin's Disease. Grace M. Roth and C. H. Watkins, Rochester, Minn.—p. 1365.
Interrelationship of Gastro-Intestinal and Renal Disease. H. Gauss, Denver.—p. 1373.
Further Observations on Carotid Sinus Reflex. L. H. Sigler, Brooklyn.—p. 1380.
Phosphatase Content of Human Serum in Pulmonary Tuberculosis Following Administration of Vitamin D. P. D. Crimm and J. W. Strayer, Evansville, Ind.—p. 1393.
Diagnosis of Dissecting Aneurysm of Aorta. E. E. Osgood, M. F. Gourley and R. L. Baker, Portland, Ore.—p. 1398.
Diet of Bluff Dwellers of Ozark Mountains and Its Skeletal Effects. E. G. Wakefield, Rochester, Minn., and S. C. Dellinger, Fayetteville, Ark.—p. 1412.

Metabolism Studies in Myasthenia Gravis.—To gain information concerning the metabolism of patients with myasthenia gravis before and during the administration of aminoacetic acid, Adams and her associates made studies of the food, urine and feces of two subjects. In the first period (four days with no aminoacetic acid) for subject 1 the balances for nitrogen, sulfur, phosphorus, magnesium and calcium were close to equilibrium. Likewise during the second period, when aminoacetic acid was administered for eleven days, there was remarkably little change in these balances. In a subsequent period during which the intake of food and aminoacetic acid was reduced, the balances continued to be much like those observed for the second period. Apparently there was a large retention of sodium in the first period, but this may be ascribed to the fact that the supplementary sodium chloride of the diet was not sufficiently accurately weighed during this period. The retention of sodium in the second period was 0.49 Gm. daily, a value not abnormally high in view of the fact that no correction for loss of sodium through the skin could be made. The potassium balance in the first period appeared to be significantly negative. In the second period this balance became somewhat less negative. During the control period, subject 2 was in definite negative balance as regards nitrogen, sulfur, phosphorus and calcium but in approximate balance as regards potassium, magnesium and possibly sodium. During the administration of aminoacetic acid, the second period, the loss of nitrogen decreased but the balance was still highly negative. No marked changes occurred in the balances of the other constituents. The nitrogen distribution during the control periods was apparently normal for each subject, except for the presence of some creatine, a condition occasionally encountered in myasthenia gravis. During the periods of administration of aminoacetic acid there occurred in subject 1 a marked temporary retention of nitrogen for the first day or two. This was later excreted, however, and the average increase in the urinary nitrogen for the entire period was equivalent to 101 per cent of the nitrogen ingested as aminoacetic acid. For subject 2 the increase in the nitrogen of the urine was equivalent to only 81 per cent of the aminoacetic acid ingested. The increased urinary nitrogen was largely in the form of urea. Changes in the other nitrogenous constituents were relatively small and accordingly the nitrogen partition products remained essentially normal. The excretion of creatinine during the periods of administration of aminoacetic acid was unchanged as compared with the excretion during the control periods. Creatine, however, was excreted in definitely increased quantities. The increased excretion of urea, ammonia, creatine, uric acid and amino acids in the periods of administration of aminoacetic acid accounted satisfactorily for all the extra nitrogen appearing in the urine, 100 per cent and 99 per cent for subjects 1 and 2, respectively. The average undetermined nitrogen fractions, therefore, were not appreciably altered by aminoacetic acid and it appears that large amounts of unknown nitrogen-containing substances were not formed, although the possibility of alterations in the character of the undetermined nitrogen fraction cannot be excluded. The excretion of total sulfur and inorganic sulfate by subject 1 during administration of aminoacetic acid was roughly parallel to the excretion of nitrogen, while there was no change in the conjugated sulfate fraction. There was a small decrease in the excretion of total sulfur by subject 2, with a more marked decrease in the inorganic fraction. At the same time the conjugated sulfates increased considerably over the rather unusually low value of the control period. There were rather substantial increases in the excretion of neutral sulfur by both subjects. The excretion of phosphate by subject 1 was markedly increased on the first day of administration of aminoacetic acid but later returned to a level only slightly above that of the control period. The excretion of phosphate in the urine by subject 2 progressively decreased during the period of administration of aminoacetic acid. It seems impossible to conclude that there is any particular metabolic abnormality in myasthenia gravis.

Treatment of Addison's Disease with Sodium Compounds.—The Reifensteins point out that in treating Addison's disease with sodium chloride it is recommended that the dosage of salt be large: from 10 to 15 Gm. daily. Divided doses seem to be most suitable, given in milk, capsules or tablets. They have had success with plain uncoated 1 Gm. tablets. Enteric-coated tablets should be used with caution, as the coating may fail to dissolve. The extract of the anterior lobe of the pituitary should be tried in addition in refractory cases, as suggested by Wilder. Sodium administered to patients with Addison's disease will either render them symptomless or else minimize the amount of cortical extract required to maintain them in relatively good health. In some cases sodium alone will bring

about a complete remission of a severe relapse. Several patients treated with sodium salts alone still continue to remain well after more than a year, and the span of life of many other patients to date seems to have been prolonged indefinitely. The loss of cortical hormone in Addison's disease apparently removes the normal regulatory mechanism of the blood sodium level, which consequently falls, initiating the train of symptoms attributed to adrenal insufficiency. An associated secondary deficiency in the hormone from the anterior lobe of the pituitary body has recently been suggested. A confirmatory test for Addison's disease of considerable value is the salt-poor diet, which will provoke a typical crisis in a true case of adrenal insufficiency and thereby aid in establishing the diagnosis.

Leukocyte Picture in Hodgkin's Disease. — Roth and Watkins made sixty-five differential counts from blood smears in forty cases in which a diagnosis of Hodgkin's disease or lymphosarcoma was confirmed by pathologic study of an excised lymph node. None of the patients had had any previous treatment. The analysis revealed that leukocytosis of slight degree was present in cases in which the duration of the disease was between one and two years. Polymorphonuclear neutrophils were slightly increased in the differential count in cases in which the disease had existed six months or longer. A slight relative decrease in the number of lymphocytes occurred in the same cases. The monocytes showed a greater tendency toward a shift to the right than occurs in normal persons. Extensiveness of the disease apparently does not produce more marked changes in the blood. There is no specific change in the leukocyte picture which is diagnostic of Hodgkin's disease. In the nine cases of lymphosarcoma, the average percentage of polymorphonuclear neutrophils was slightly decreased and the average percentage of lymphocytes slightly increased as compared with the results in cases of Hodgkin's disease. The percentages of other leukocytes and the total leukocyte count were nearly the same as they were in cases of Hodgkin's disease.

Annals of Otol., Rhinol. and Laryngology, St. Louis

44: 913-1206 (Dec.) 1935

Architecture of Blood Vascular Networks in Erectile and Secretory Lining of Nasal Passages. P. F. Swindle, Milwaukee.—p. 913.
Cancer of Epiglottis: Total Extirpation of Epiglottis by Laryngofissure Route. G. Tucker, Philadelphia.—p. 933.
Anatomic Anomalies of Importance to Otolaryngologist. O. V. Batson, Philadelphia.—p. 939.
Association of Filtrable Virus and Bacteria in Production of Experimental Sinusitis. C. S. Linton, St. Louis.—p. 948.
Acute Suppurative Otitis Media in Measles: Report of Four Hundred and Twenty-Seven Patients. H. J. Williams, Philadelphia.—p. 956.
*Streptococcus Haemolyticus Bacteremia, with Especial Reference to Otolaryngologic Conditions. J. L. Goldman and G. Shwartzman, New York.—p. 961.
Actinomycosis of Sphenoid with Actinomycotic Meningitis and Brain Abscess. R. Kramer and M. L. Som, New York.—p. 973.
Syphilitic Tonsillitis: Histopathology in Secondary Stage. E. R. Pund and Georgia H. Brawner, Augusta, Ga.—p. 984.
The Sore Throat in Early Syphilis. J. W. Brittingham, Augusta, Ga. —p. 990.
Congenital Fibro-Epithelial Cyst of Nasal Vestibule: Review of Theories of Pathogenesis. J. A. Weiss, Chicago.—p. 993.

Hemolytic Streptococcus Bacteremia. — Goldman and Shwartzman classified their 168 cases of hemolytic streptococcus bacteremia according to the port of entry of the organism. Of the 168 patients, ninety-one died. A mortality rate ranging from 60 to 100 per cent was encountered in the following groups: gynecologic infections, articular and osseous infections, miscellaneous nonbacterial conditions associated with hemolytic streptococcus, surgical postoperative infections, pulmonary infections and acute otitis media with meningitis. In contrast to these, the mortality rate of the cases of secondary erysipelas was 20 per cent, of upper respiratory infections 34 per cent, of peripheral infections 36 per cent, of lateral sinus thrombosis 37 per cent, and of primary erysipelas 50 per cent. Of the cases in which the primary foci were located in the respiratory tract, 91 per cent occurred in the winter and spring months. The remaining conditions manifested no particular seasonal influence. Infections of the upper respiratory tract, lateral sinus thrombosis and osseous and articular infections showed a tendency to occur during the early years of life. The other conditions evidenced no predilection for a special age. In the group of peripheral infections the mortality during the middle years of life was 75 per cent as compared to 25 per cent during the earlier years of life. The quantitative estimation of the number of hemolytic streptococci in the blood stream had both diagnostic and prognostic significance. The conspicuous groups illustrating the diagnostic value of these blood cultures were the cases of lateral sinus thrombosis, infections of the upper respiratory tract and peripheral infections. The prognostic import of these blood culture results is demonstrated by the fact that the groups with relatively low mortality presented a high percentage of positive blood cultures in fluid mediums only, while the groups with relatively high mortality had a high percentage of positive blood cultures in both solid and fluid mediums. Recovery occurred only in the gynecologic and associated nonbacterial cases showing growth in fluid mediums. The ten cases of infection of the upper respiratory tract in which long bone metastases developed manifested a predilection for young children, a tendency toward complete recovery (90 per cent), and a small number of organisms in the blood stream in a majority (fluid mediums only, 60 per cent).

Archives of Otolaryngology, Chicago

23: 391-508 (April) 1936

Esophagitis: I. Anatomy and Physiology and Review of Literature. H. R. Butt and P. P. Vinson, Rochester, Minn.—p. 391.
*Bronchoscopic Studies of Abscess of Lung. I. B. Goldman, New York. —p. 414.
*Acute Laryngotracheitis in Children: Study of Forty-Three Cases Occurring at the Children's Hospital, Los Angeles, in Epidemic Form, During the Fall and Winter of 1933-1934. W. J. Smith, Phoenix, Ariz.—p. 420.
Scope of Physical Therapy in Otolaryngology. A. R. Hollender, Chicago.—p. 429.
Brucellosis in Otolaryngology. C. C. Cody Jr., Houston, Texas.—p. 441.
Rhinitis Caseosa: Analysis of Literature and Report of Case. H. Meyersburg, P. Bernstien and D. Mezz, Brooklyn.—p. 449.
Surgical Repair of Facial Nerve. R. C. Martin, San Francisco.—p. 458.
Variation of Pedicle Flap for Epitheliation of Radical Mastoidectomy Cavity. M. S. Ersner and D. Myers, Philadelphia.—p. 469.

Bronchoscopic Studies of Lung Abscess.—According to Goldman, the value of the bronchoscopic examination may be best comprehended by realizing that an abscess of the lung is nearly always at one time or other openly connected with the bronchial tree and that the abscess which occupies a bronchopulmonary segment usually empties directly into a bronchus of the fifth or sixth order. Although the bronchoscope cannot enter the abscess cavity, the examination serves in a useful capacity in localization of the bronchopulmonary segment in which the abscess lodges. Identification of the orifice leads to recognition of the associated segment. Bronchoscopic examination, by visualizing the bronchial orifice, can reveal the position and extent of the pathologic process in the lung and define the area to be exposed by the surgeon. The most reliable single bronchoscopic sign of pulmonary abscess is the escape of foul pus from the mouth of the bronchus. The tracheobronchial tree is frequently congested and swollen. The mucous membrane of the bronchial orifice leading to the abscess is usually red and angry looking. Granulations may be present, or the mucous membrane itself may have a granular appearance. These changes in the mucous membrane are important in the differentiation of the origin of the pus in the bronchial tree, some of which may spill over to adjacent bronchi and make localization more difficult. If the spill-over is observed early, the mucous membrane of the bronchus may be so swollen as to occlude the opening of the bronchus. As the condition progresses into a chronic stage, secondary bronchiectasis develops. The pus from the bronchiectatic cavity is usually foul, but after a long interval the foul odor may disappear. This may indicate bronchiectasis around a shut-off abscess. Other bronchoscopic observations are those of distortion of the trachea, deformity of the carina, obstruction of bronchi, distortions of the bronchi, which are often associated with granulation tissue, and stenosis occurring in the fibrotic stage.

Acute Laryngotracheitis in Children.—Smith declares that a selective phase of an apparently mild infection of the upper respiratory tract was shown during the winter of 1933-1934 in and about Los Angeles. As a result, he has collected forty-three cases of nondiphtheritic laryngotracheitis, in

all of which the patient was so ill as to warrant hospitalization. The youngest patient was 6 months of age and the oldest 7 years. The predominating age was from 12 to 24 months. The condition was accompanied by some signs of an infection of the upper respiratory tract. Many of the patients had nothing more than mild pharyngitis or rhinitis for from twelve to forty-eight hours preceding definite symptoms that pointed to an infected and inflamed larynx. Hoarseness was the principal symptom, though it was not always present because the edema is more marked below the level of the true vocal cords. This dysphonia often progressed until a stage of complete aphonia was reached. There was associated a dry croupy irritative type of cough, nonproductive in character. As the edema progressed, the effects of mechanical obstruction became manifest. Retraction took place and was followed by restlessness. As the condition becomes progressively worse, cyanosis develops, which results not only from a limited supply of oxygen but from cardiac exhaustion. It is marked by a paleness rather than the usual blue type of cyanosis. When the latter stage is reached the child is usually moribund and beyond aid. Inspection by direct laryngoscopy usually showed the pharynx, epiglottis and larynx to be hyperemic. No actual membrane was present in any of these cases, although in a few there was a purulent sticky secretion, which adhered to the walls but could be easily removed without any resultant bleeding. In twenty-nine cases the chest was normal. Of the twelve cases in which tracheotomy was performed, there were only five in which positive signs were observed. The temperature, while not greatly elevated, showed evidence of an infection. The red blood cells and hemoglobin were not greatly altered from normal. The hemolytic streptococcus was the predominating organism, but the rapidity of the infection probably did not allow sufficient time for a great change to take place. The white cell count in most cases was in the normal range. Palliative treatment was considered only for the patients with mild involvement in whom retraction was not present or, if so, was very mild and was not increasing. Surgical intervention for the severe form is usually called for, which in twelve patients consisted of tracheotomy. Adequate posttracheotomy care is imperative. Of the twelve patients who required surgical intervention, four died.

Archives of Pathology, Chicago

21: 419-564 (April) 1936

*Atherosclerosis: Special Consideration of Aortic Lesions. T. Leary, Boston.—p. 419.
Id.: Etiology. T. Leary, Boston.—p. 459.
Ultraviolet Spectrophotometric Studies of Human Blood Plasma. F. L. Dunn and A. T. Sudman, Omaha.—p. 463.
Cardiovascular and Arthritic Lesions in Guinea-Pigs with Chronic Scurvy and Hemolytic Streptococcic Infections. M. P. Schultz, Washington, D. C.—p. 472.
*Factors Determining Necrosis or Survival of Liver Tissue After Ligation of Hepatic Artery. L. Loeffler, Brooklyn.—p. 496.
Development of Sarcoma in Male Mice Receiving Estrogenic Hormones. W. U. Gardner, G. M. Smith, L. C. Strong and E. Allen, New Haven, Conn.—p. 504.
Reactivity of Malignant Neoplasms to Bacterial Filtrates: II. Relation of Mortality to Hemorrhagic Necrosis and Regression Elicited by Certain Bacterial Filtrates. G. Shwartzman, New York.—p. 509.

Atherosclerosis.—Leary obtained diverse aortic lesions at necropsies from his service as medical examiner and supplemented this by aortas from the pathologic service of the Boston City Hospital and from the Children's Hospital. Most of the material was studied in frozen sections, after fixation in solution of formaldehyde, or in fresh sections. He found that all the lesions of aortic atherosclerosis, save the earliest mucoid change, are due to the presence of cholesterol. They are primarily intimal and depend for their nutrition on imbibition through the endothelium. In youth, cholesterol is introduced into the subendothelial tissue of the intima by globular lipophages or is engulfed by globular lipophages in this situation. Young fibroblastic tissue is produced in the subendothelial tissue, and the young fibroblasts engulf and metabolize the lipoid, leading to its disappearance from the lesions. Repair with minimal scarring follows, since the young fibroblastic tissue does not form collagen. In middle age cholesterol metabolism within lipoid cells is slowed, the connective tissue forms collagen and scar tissue is produced. There is interference with imbibition of nutriment through the scar tissue, and the deep layers undergo necrosis, with the formation of secondary atheromatous "abscesses" (atherocheumas). Scars are the typical lesions in this period. In old age cholesterol metabolism ceases, globular lipophages accumulate in masses, with inadequate nutrition and support, and a primary atheromatous abscess is the typical lesion. The lesions of the ascending arch are exceptions to these rules, the metabolism of cholesterol being successfully carried on, as in youth, up to advanced ages. The connective tissue that is formed is reticular, as in youth, and minimal scarring is usual. Calcification arises in connection with necrobiosis or after necrosis has developed. It is a terminal monumental deposit marking the sites formerly occupied by living tissue.

Liver Tissue After Ligation of Hepatic Artery.—Loeffler did not produce necrosis of liver tissue in rats unless he ligated a branch of the hepatic artery and one of the portal vein at the same time. When partial necrosis occurred in any animal after ligation of the hepatic artery, both the hepatic artery and the portal vein were supposed to be occluded and the blood supply of the corresponding parts completely obstructed. This happened because of thrombosis of branches of the portal vein or of hepatic veins, either directly, through lack of blood supply to the walls of these vessels, or indirectly, owing to necrosis of the wall, caused by extravasation of bile from the necrotic gallbladder or bile ducts in some areas. Obstruction of both vessels in this way resulted in anemic or hemorrhagic infarcts of the liver.

California and Western Medicine, San Francisco

44: 249-352 (April) 1936

The Modern Therapy of Syphilis as Administered at the University of California Outpatient Department. H. Morrow, N. N. Epstein and L. K. Gay, San Francisco.—p. 257.
Tolerance to Alcohol: Its Mechanism and Significance. E. Bogen, Olive View.—p. 262.
Intracapsular Fractures: Neck of Femur: Statistical Survey of End Results. M. C. Mensor and E. T. Dewey, San Francisco.—p. 271.
Cataracts Following Use of Dinitrophenol: Summary of Thirty-Two Cases. F. H. Rodin, San Francisco.—p. 276.
Medicine and Surgery in the Fleet. L. W. Johnson, Mare Island.—p. 279.
Urinary Extravasation Following Urethral Stricture. C. F. Rusche and S. K. Bacon, Hollywood.—p. 284.
Studies in Rickets: Clinical Findings in One Thousand Private Patients. C. U. Moore and H. G. Dennis, Portland, Ore.—p. 288.

Canadian Public Health Journal, Toronto

27: 157-208 (April) 1936

*Protamine Insulin. R. B. Kerr, C. H. Best, W. R. Campbell and A. A. Fletcher, Toronto.—p. 157.
Twenty Years' Progress in Sanitary Conditions of Montreal. E. Gagnon, Montreal.—p. 160.
Laboratory Identification of V Form of Bacillus Typhosus. J. Craigie and K. F. Brandon, Toronto.—p. 165.
Criteria for Selection of Suitable Strains of Bacillus Typhosus for Use in Preparation of Typhoid Vaccine. M. H. Brown, Toronto.—p. 171.
Summary of Results of Treatment in Early Syphilis. S. C. Peterson and C. R. Donovan, Winnipeg, Manit.—p. 176.
Construction and Equipment in Relation to Operation of Swimming Pools. R. F. Heath, Toronto.—p. 180.
Arsenical Poisoning in Construction Camp. F. W. Jackson, Winnipeg, Manit.—p. 185.

Protamine Insulin.—Kerr and his associates used protamine insulin in twenty-five cases of diabetes. They agree with Root, White, Marble and Stotz that, following the administration of protamine insulin, the blood sugar curve is not lowered so precipitately as with regular insulin but slopes off more gradually, is less likely to pass below normal levels and rises slowly to previous levels. The duration of the curve is from two to three times as long as when a similar dose of regular insulin is used. When patients receiving regular insulin are allowed to have a moderate glycosuria, the substitution of an equal dose of protamine insulin causes diminution in the glycosuria, ketosis improves and the patient's feeling of well being is definitely more marked. In the severe cases and in juvenile and the so-called unstable diabetic patients, reactions due to hypoglycemia have been found to be much less frequent with protamine insulin. The authors regard this as one of the main advantages of the new product. In conditions in which more rapid action is desirable, such as coma, regular insulin is to be preferred. Protamine insulin has presented new problems in the administration of insulin; so far the administration of a

dose of regular insulin in the morning and an evening dose of protamine insulin seems to be favored by others. While the authors have found this mode of administration to be satisfactory in many instances, in others different adjustments of dosage and combinations of regular and protamine insulin appear to be more effective in the control of some cases of diabetes. Therefore, further experience with protamine insulin is required before general rules for its use can be formulated. Protamine insulin gives promise of being an important contribution to the restoration of a more physiologic state in the diabetic patient.

Indiana State Medical Assn. Journal, Indianapolis

29: 163-214 (April 1) 1936

Indiana's Program in Maternal and Child Health Under the Social Security Act. A. McCown, Washington, D. C.—p. 163.
Professional Anesthesia: Hospital Plan in Operation Eighteen Years. A. L. Schwartz, Cincinnati.—p. 165.
Late Toxemias of Pregnancy. G. W. Gustafson, Indianapolis.—p. 168.
Toxic Diffuse Goiter (Exophthalmic): Its Diagnosis and Treatment. J. R. Yung, Terre Haute.—p. 172.
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Treatment of Some of the More Common Skin Diseases. L. A. Sandoz, South Bend.—p. 233.

Benign Tumors of the Stomach.—Van Buskirk states that the occurrence of gastric polyposis is relatively infrequent. The etiology is not definitely known. The condition is often found in association with hypertensive cardiovascular disease, syphilis, tuberculosis, chronic pleurisy and atheroma of the vessels. The microscopic picture consists of hypertrophied gastric glands and varying stages of vascular congestion involving only the mucosa in general, the musculature and the connective tissue being free. Grossly, the tumors are more or less uniform, being soft in consistency and gray, grayish brown or red, depending on the vascularity. They may vary in size from millet seeds to covering the major portion of the stomach. The surface of the tumors may be covered with a thick egg white mucus or hemorrhagic areas of ulceration. At times inspection of the stomach will not be very enlightening, but palpation may give the sensation of the presence of food. That the symptoms of gastric polyposis are not characteristic is revealed by the fact that they are unexpectedly found at necropsy or at operation. At times the duration of symptoms covers a period of years and then occasionally may be very brief, with anemia, loss of weight and strength being the apparent sole manifestations. In some cases a sense of pressure or weight in the epigastrium, progressing to discomfort and abdominal distress, and in other cases abdominal pain are usually the most common complaints. The physical observations are practically negative. The most important procedures revealing conclusive evidence consist of fluoroscopy, x-ray and gastroscopy. In making a diagnosis of gastric polyposis, all factors must be considered and all possibilities must be utilized. In the differential diagnosis of gastric polyposis, carcinoma, extragastric tumors, foreign bodies, hairballs, ulcer, pernicious anemia, functional dyspepsia, sarcoma and syphilis should be considered; but any of these conditions may be present coincidentally with gastric polyposis. In all cases careful roentgenologic examination with accurate interpretation offers the greatest aid in diagnosis. Carcinoma is sometimes found in conjunction with gastric polyposis, one portion of the tumor being benign and the other part undergoing malignant degeneration. Cases with stenosis of the pylorus or obstruction of the pylorus due to a polyp of the stomach, intermittent stenosis of the pylorus due to a gastric polyp, intussusception into the stomach and duodenum due to a gastric polyp and hemorrhage have been reported as complications. Surgical and adequate reconstructive procedures are indicated in the individual cases and often have changed a diagnosis of malignant tumor to one of benign tumor and given the patient years of good health. When surgical removal is possible, roentgen therapy and radium may prove beneficial.

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*Method of Dealing with Chronic Osteomyelitis by Saucerization Followed by Skin Grafting. B. Armstrong, Margate, Kent, England, and T. F. Jarman, Bridgend, Wales.—p. 387.
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End Results in One Hundred Fractures Treated by Internal Removable Fixation. W. B. Carrell, Dallas, Texas.—p. 408.
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Apophyseal Subluxation: Disturbances In and About Intervertebral Foramen Causing Back Pain. L. A. Hadley, Syracuse, N. Y.—p. 428.
Hemihypertrophy and Hemiatrophy: Congenital Total Unilateral Somatic Asymmetry. C. W. Peabody, Detroit.—p. 466.
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Localized Osteitis Fibrosa in the New-Born and Congenital Pseudarthosis. E. L. Compere, Chicago.—p. 513.
*Pathologic Dislocation of Sacro-Iliac Joint. J. B. L'Episcopo, Brooklyn.—p. 524.

Hematogenous Acute Osteomyelitis in Children.—Wilson and McKeever discuss the effect of early and late operations, with regard to the mortality and development of secondary foci, on 110 patients suffering from hematogenous acute osteomyelitis, exclusive of the bones of the head and the face. The data suggest that perhaps the answer to the problem is not the earliest possible surgical invasion of the bone, but a well timed adequate drainage of the medullary canal when the patient's resistance is at the highest possible point. It has been their repeated experience that an acutely suffering child who enters the wards in a badly dehydrated condition with a very high temperature and pulse rate will become a vastly better operative risk in twenty-four, forty-eight or even seventy-two hours, during which time the suffering has been relieved and the dehydration overcome. The improvement in the general condition will be obvious. The lesion will probably be quite evident when the child enters the hospital, as will the eventual necessity for an operative procedure; but timing is the important factor in treating acutely sick children. A blood-borne infection of bone may be more successfully handled by adhering to the principle of allowing the infection to localize. A catastrophe may result from a too early ostectomy of an infected bone, for the same reason that incision of a brawny cellulitis is often fatal. On the other hand, it seems unwise to permit a patient to harbor a well formed abscess for days or to drain such an abscess only partially and imperfectly. Such procedures favor the formation of multiple metastatic lesions, as is evidenced by the preponderance of these lesions in cases in which only incision of the soft tissues was carried out, or those in which spontaneous rupture of the abscesses was permitted.

Treatment of Chronic Osteomyelitis.—Armstrong and Jarman conceived the idea that skin grafting might be applied in promoting the rapid epithelization and healing of bone cavities left after radical operative treatment of chronic osteomyelitis. Prior to the adoption of this method some eight years ago, these cavities had been treated by packing with sterile gauze in the

ordinary way, and it was noted that the granulations grew much faster from the peripheral parts of the cavities than from their depths, which often resulted in the formation of small deep-lying saccules connected by a narrow track with the superficial surface of the granulation tissue. These saccules were responsible for the persistence of multiple points of discharge on the surface of the granulation tissue and therefore failure of epithelization. The method described obviates this disadvantage and promotes really rapid epithelization. The first stage consists of saucerization of the diseased area and the second stage of skin grafting of the cavity, Esser's plan being used of applying the grafts on a mold of Stent's dental composition. The authors do not claim that the end results are superior to those obtained by the Orr method but that their method has the advantage of promoting faster epithelization and healing and that there is no unpleasant odor associated with it. It has occurred to them that this method might, with advantage, be applied during Baer's maggot treatment at that stage when the wounds are filled with healthy, red granulations, when the reaction of the wound discharges is alkaline and when pathogenic bacteria are few. The deep but completely epithelized cavities which result from this method of treatment tend to diminish with the passage of years.

Pathologic Dislocation of Sacro-Iliac Joint.—L'Episcopo reports a case of true pathologic dislocation of the sacro-iliac joint. He doubts whether the suppurative condition alone was responsible for the dislocation, because the os innominatum cannot slide upward on the sacrum unless there is also a separation at the symphysis pubis, so that there must be a loosening of both these joints for the condition to occur. The patient gave a history of having a spontaneous abortion a few weeks before the onset of the acute infection of the sacro-iliac joint. She was about two months pregnant at the time. Probably because of the action of some hormone there is a relaxation of all the pelvic joints during pregnancy. However, relaxation of these joints takes place in a lateral direction. Because of the preexisting physiologic relaxation at the symphysis pubis, it is the author's belief that the coincident infection of the sacro-iliac joint, with resulting destruction in that joint, was responsible for the upward displacement of the os innominatum on the sacrum.

Journal of Nutrition, Philadelphia

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Healing of Rickets in Rats on Diet Containing Negligible Amounts of Calcium and Vitamin D. J. H. Jones and B. N. E. Cohn, Philadelphia.—p. 293.

Effect of Quantitative Underfeeding and of Vitamin A Deficiency on Tissue Lipids of Rats Fed Diets Low in Cholesterol. Helen L. Gillum and Ruth Okey, Berkeley, Calif.—p. 303.

Effect of Quantitative Underfeeding and of Vitamin A Deficiency on Liver Lipids of Rats Fed Diets with Added Cholesterol. Helen L. Gillum and Ruth Okey, Berkeley, Calif.—p. 309.

Basal Metabolism of Wyoming University Women. Elizabeth J. McKittrick, Laramie, Wyo.—p. 319.

*Study of Magnesium Needs of Preschool Children. Amy L. Daniels and Gladys J. Everson, with cooperation of Mary F. Deardorff, Elizabeth M. Knott, Florence I. Scoular and Olive E. Wright, Iowa City.—p. 327.

Studies on Relation of Diet to Goiter: III. Further Observations on Goitrogenic Diet. R. E. Remington and H. Levine, Charleston, S. C. p. 343.

Antiscorbutic Potency of Reversibly Oxidized Ascorbic Acid and Observation of Enzyme in Blood Which Reduces Reversibly Oxidized Vitamin. J. H. Roe and G. L. Barnum, Washington, D. C.—p. 359.

Results of Feeding Various Levels of Soil Containing Beryllium to Chickens, Dogs and Rats. C. W. Duncan and E. J. Miller, East Lansing, Mich.—p. 371.

*Vitamin Content of Canned Pineapple Juice. N. B. Guerrant, R. A. Dutcher, Florence S. Tabor and R. Rasmussen, State College, Pa. —p. 383.

Magnesium Needs of Preschool Children.—Daniels and Everson made thirty-three magnesium, calcium and phosphorus balance studies in thirteen children between 4 and 7 years of age, who received varying amounts of magnesium as well as calcium and phosphorus. Each balance study, with one exception, has consisted of a preliminary period of six or seven days to allow for adjustment to a given ingestion level, and a double metabolism period of five days each, thus minimizing unavoidable errors from inaccurate stool marking. Each day's food consisted of milk, meat, eggs, potatoes, prunes, apple sauce, banana, carrots, breakfast cereal, bread, butter and 1.5 Gm. of iodized table salt, distributed among the three meals. Distilled water was used for drinking and cooking purposes. The question of vitamin D or C deficiency was ruled out by 3.6 Gm. of cod liver oil and 4 drops of viosterol twice daily, with a given amount of orange juice and 120 Gm. of canned tomato. Variations in the level of magnesium were obtained by altering the amount of milk and cereals in the diets. The methods for the calcium and phosphorus determinations were the same as those of a former study. Magnesium determinations were made with filtrates from the calcium precipitates by the method described by Epperson. The magnesium ingestions of the children studied were between 11.3 and 19 mg. per kilogram, whereas the magnesium retentions ranged between 0.4 and 3.1 mg. per kilogram. High retentions were not consistently associated with high ingestions, nor were low ingestions always followed by low retentions. Calcium : magnesium ingestion ratios ranged between 2.8 and 6.7, whereas calcium : magnesium retention ratios were between 3.8 and 30.3. The magnesium of the urine, which tended to parallel the magnesium ingestion, suggested that this might be used as a means of determining the sufficiency of the diet in this respect. Low urinary magnesiums, when coexistent with low retentions, were indicative of too low ingestions. High urinary magnesiums with low retentions were interpreted as indicating that enough had been fed and that previously the individual had been receiving a diet containing a sufficient amount, whereas high urinary magnesiums with high retentions following high ingestions indicated that the individual had been receiving previously less than the optimal amount. Seventy-five per cent of the children studied were in this group. It was concluded tentatively that diets of children of the ages studied should contain not less than 13 mg. of magnesium per kilogram of body weight.

Vitamin Content of Canned Pineapple Juice.—Guerrant and his associates made a biologic assay of canned pineapple juice for its vitamin content, using standard biologic methods, which showed this juice to be a good source of vitamins A and B and a fair source of vitamin C, and to contain a measurable quantity of vitamin G. When expressed in terms of vitamin units, 1 ounce of the juice contained approximately 30 Sherman units of vitamin A, 20 Sherman units of vitamin B, 2.5 Sherman units of vitamin G, and four minimal protective doses or 40 international units of vitamin C.

Journal of Pharmacology & Exper. Therap., Baltimore

56: 389-492 (April) 1936

*Effect of Ephedrine on Erythrocytes, Leukocytes and Platelets in Normal and Splenectomized Guinea-Pig. S. L. Simpson and B. H. E. Cadness, London, England.—p. 389.

Depressor Substances in Posterior Lobe of Pituitary. E. Larson, Philadelphia.—p. 396.

*Antagonism Between Posterior Lobe Pituitary Hormones and Insulin. H. C. Ellsworth, Montreal.—p. 417.

Studies of Morphine, Codeine and Their Derivatives: XII. Isomers of Morphine and Dihydromorphine. N. B. Eddy, Ann Arbor, Mich. —p. 421.

Comparison of Effects of Sodium Iso-Amylethylbarbiturate (Sodium Amytal) and of Sodium N-Hexylethyl Barbiturate (Ortal Sodium) on Intact Intestine in Unanesthetized Dog. C. M. Gruber, Philadelphia.—p. 432.

Further Observations with New Method of Demonstrating Changes in Blood Supply of Ear. P. J. Hanzlik, F. De Eds and B. Terada, San Francisco.—p. 440.

Central Action of Acetylcholine. G. A. Silver and H. G. Morton, Durham, N. C.—p. 446.

Increased Cardiac Output of Dinitrophenol. J. V. Galgiani and M. L. Tainter, San Francisco.—p. 451.

Alleged Occurrence of Acetylcholine and Adrenalin in Cat's Saliva. J. Secker, Newcastle upon Tyne, England.—p. 464.

Study of Twenty-Three Quaternary Ammonium Iodides. H. M. Lee, A. M. Van Arendonk and K. K. Chen, Indianapolis.—p. 466.

Choline as Factor in Elaboration of Adrenalin. R. L. Stehle, K. I. Melville and Frances K. Oldham, Montreal.—p. 473.

Effect of Ephedrine on Erythrocytes, Leukocytes and Platelets.—Simpson and Cadness gave female guinea-pigs weighing from 300 to 400 Gm. subcutaneous injections of ephedrine hydrochloride in a 2 per cent aqueous solution. The dose used was 2 mg. per hundred grams of body weight. Specimens of blood were obtained by pricking the small vessels of the ear before injection and subsequently at intervals of two

hours for a period of from twelve to twenty-four hours. The duration of the effect of the ephedrine was indicated by the persistence of exophthalmos and erection of hair. The usual methods of enumerating the different cell elements were employed. For the experiments on splenectomized pigs the spleen was removed under pentobarbital sodium and ether anesthesia, and the postoperative effect of ephedrine on the blood was ascertained after a period of ten days, in which time the guinea-pigs appeared to have made a complete recovery. In normal guinea-pigs the erythrocytes were increased by more than a million, the leukocytes by some 10,000 and the platelets by almost a million. The hemoglobin, although raised 17 per cent, did not increase to quite the same extent as the erythrocytes (22 per cent). The initial leukocytosis was associated with a preponderance of lymphocytes, but subsequently there was a progressive increase in the proportion of polymorphonuclear neutrophils. The maximal numerical increase was attained first by the erythrocytes, then by the leukocytes and finally by the platelets. The increases in the total number of erythrocytes, leukocytes and platelets in splenectomized guinea-pigs were of the same order as those obtained in the normal guinea-pigs. With increasing skill in the performance of splenectomy, the operation did not appreciably affect the blood count when taken after a period of ten days. The conclusion is that the spleen is not essential for these changes in the guinea-pig. In addition to other evidence the disproportionate increase in the different cell elements indicated that "blood concentration" is not an adequate explanation of the changes. Ephedrine probably causes extrusion into the circulation of erythrocytes, leukocytes and platelets from storage and hematopoietic centers, including the bone marrow.

Posterior Lobe Pituitary Principles and Insulin.—Ellsworth offers evidence that mild insulin hypoglycemia in dogs can be abolished completely by small doses of the oxytocic principle of the posterior lobe of the pituitary; corresponding doses of the pressor fraction have little or no effect. Larger doses of the oxytocic principle not only abolish the effect of insulin but cause a rise in the blood sugar level above normal.

Military Surgeon, Washington, D. C.

78: 241-328 (April) 1936

Centennial of World's Largest Medical Library: the Army Medical Library of Washington, Founded 1836. E. E. Hume.—p. 241.
The First Reserve Officers Camp. H. C. Coe.—p. 267.
*Diagnosing the Undiagnosed Lues. W. S. Bainbridge.—p. 273.
The Seventh American Scientific Congress, with Especial Reference to Section on Hygiene. B. J. Lloyd.—p. 281.
Organization and Function of Medical Regiment. N. J. Kirk.—p. 282.
Acute Nondiphtheritic Inflammatory Edema of Larynx: Report of Seven Cases with Sudden Death from Asphyxia. R. O. Dart.—p. 287.
The Ship's Surgeon of Three Centuries Ago. W. H. Michael.—p. 295.
Report on Malarial Control, Fourth Corps Area. W. N. Bispham.—p. 299.
The Art of Growing Old. F. J. Vokoun.—p. 304.
Records in the Nursing Division of the Surgeon General's Office. Julia C. Stimson.—p. 307.

Undiagnosed Syphilis.—As an aid in the diagnosis of syphilitic infection, Bainbridge used definite changes of the hands observed roentgenographically, though there may not be any symptoms in this region or any general evidence of the disease. He quotes Riley and Smith: "An important finding both in acquired and congenital syphilis, which so far as we know has not been recognized and which is oftentimes of very great value in deciding the diagnosis, is the occurrence on the phalanges of the subperiosteal budding and resorption areas without necessary relation to any other syphilitic pathology. These may be so slight as to be either overlooked or disregarded till their diagnostic importance is realized. Even with a negative Wassermann reaction, so frequent with bone syphilis, their occurrence is a definite indication of syphilitic infection." This pathologic change is noted along the shafts of the phalanges and does not occur at the joints to be confused with arthritis. A combination of the areas of budding and resorption, and arthritic changes may be present in the same case and make the diagnosis doubly difficult. In addition, in these cases of possible syphilitic infection, at times, there is an irregularity of the cancellous tissue and in the alinement of the compact tissue surrounding it. Often the changes are so slight that a high powered magnifying glass must be employed to detect them. The roentgenologist, looking for gross lesions, frequently does not observe these changes, or discounts their presence as of no significance and submits a negative diagnosis. The author has found this diagnostic adjunct to be of assistance in deciding doubtful cases, or as a lead to the diagnosis in some heretofore unsuspected ones. In cases in which the serologic tests have been weakly positive but definite areas of budding and resorption existed, he has been led to give a provocative Wassermann test, with the observation that in most of them a positive reaction occurred. Whether or not the blood or spinal fluid confirmed the roentgen observations, in many cases in which the latter have given apparent evidence by the areas of budding and resorption—really scars—of a specific infection, antisyphilitic treatment has been instituted, and the beneficial results proved the accuracy of the diagnosis.

New York State Journal of Medicine, New York

36: 591-680 (April 15) 1936

Modern Renal Surgery, with Particular Reference to Heminephrectomy. O. S. Lowsley, New York.—p. 591.
Psychic Factors in Gastro-Intestinal Disease. G. E. Daniels, New York.—p. 602.
Prognosis of Moderate Deafness in Youth: Variations with Disease, Management and Treatment. E. P. Fowler, New York.—p. 607.
A Hospital Epidemic of Diphtheria. J. E. Perkins, Amsterdam.—p. 614.
Lipoidosis Cutis et Mucosae. R. N. Tripp, New York.—p. 619.
Concentrated Antipneumococcus Serum in Type I Pneumonia: Control of Dosage by Skin Tests with Type Specific Polysaccharide. T. J. Abernethy, New York.—p. 627.
Tumors at the Base of the Skull. S. B. Wortis and S. Brock, New York.—p. 635.
Erythroblastic Anemia: Clinical Observations in an Adult. E. G. Allen and D. S. Childs, Syracuse.—p. 641.
Chronic Lymphoid Leukemia with Leukemic Phlebitis. H. H. Haft, W. A. Groat and T. C. Wyatt, Syracuse.—p. 646.
Subcutaneous Emphysema Complicating Labor: Case Report. H. F. Hulbert, Dansville.—p. 648.
Between Mental Health and Mental Disease. B. Liber, New York.—p. 650.
Medical History of Schenectady County. E. Kellert, Schenectady.—p. 651.

Philippine Islands Med. Association Journal, Manila

16: 133-202 (March) 1936

Situs Inversus Totalis and of Dextrocardia Discovered by X-Ray Among Filipinos: Cases. S. A. Francisco and C. Ongpin, Manila.—p. 133.
*Air-Tight Drainage of Nontuberculous Empyema. J. Santillan and B. B. Perez, Manila.—p. 141.
Food Intake of Filipino College Students. I. Concepcion, Manila.—p. 155.
The New Deal in Medicine. R. L. Blanco, Cebu.—p. 165.
Postoperative Leakage in Ureterolithotomies. J. Eduque and A. T. Zavalla, Manila.—p. 171.
Rôle of Gelatin Formula in Reducing Postnatal Birth Weight of the New-Born. H. Acosta-Sison and J. S. Galang, Manila.—p. 177.

Air-Tight Drainage of Nontuberculous Empyema.—Santillan and Perez treated six cases of acute empyema by air-tight drainage. One happened to be of tuberculous and pneumococcic origin and another developed pyarthrosis of the left shoulder, which proved fatal. The treatment is started a few days after the onset of the empyema. The method used by Bettman is adhered to. The site selected is the eighth or ninth interspace at the posterior axillary line. The space selected need not necessarily be the most dependent portion of the cavity. In fact, this may be a handicap; for, when the diaphragm rises as the cavity of the empyema diminishes in size, the tube which is at the bottom will necessarily be pressed by the rising diaphragm. The site is anesthetized locally with procaine hydrochloride, an aspirating needle is inserted, a small amount of pus is aspirated to insure success, a small slit is made in the skin, and a trocar admitting a No. 14 French catheter is inserted. The trocar is gradually introduced perpendicularly to the thorax. When the cavity is reached the obturator is pulled out and the lubricated catheter is inserted immediately. The flaring edge of the catheter is cut and rethreaded on the same catheter in order to keep it in place. Dressings are applied. The pus is aspirated every three hours and from one third to one half of its volume is replaced by

dilute solution of sodium hypochlorite. After one week if airtightness is lost another catheter, one size larger, is inserted. By introducing catheters of increasing sizes, the cavity is kept almost continuously air tight. When the fever drops, which usually takes place in from one to three weeks, the patient is permitted to walk, to take bending exercises and to blow rubber balloons. Before doing so, the free end of the tube is connected with a two-holed, wide-mouthed bottle half filled with dilute solution of sodium hypochlorite. A pocket is made on one side of the patient's binder and the bottle is put in it. By this method the patient can walk around with ease and comfort. When this stage of the treatment is reached the aspiration is done only once or twice daily. The siphonage into the bottle replaces the aspiration, and the patient may be discharged from the hospital and be treated at home or at the clinic.

Radiology, Syracuse, N. Y.

26: 391-520 (April) 1936

Roentgenographic Image of Neoplasms of Bone. C. G. Sutherland, Rochester, Minn.—p. 391.
*Roentgenologic Changes in Malacic Diseases of Bone. J. D. Camp, Rochester, Minn.—p. 399.
Radiotherapy for Bone Tumors. A. U. Desjardins and W. C. Popp, Rochester, Minn.—p. 409.
Clinical and Surgical Aspects of Bone Tumors. H. W. Meyerding, Rochester, Minn.—p. 417.
Roentgenographic Features of Skeletal and Extraskeletal Lesions in Some Diseases of Children. R. L. J. Kennedy, Rochester, Minn.—p. 424.
*Pathogenesis and Radiotherapy in Carcinoma of Thyroid. I. Levin, New York.—p. 436.
Shape of Female Pelvis and Its Clinical Significance: Roentgen and Clinical Study. L. H. Garland, A. V. Pettit, R. D. Dunn and P. Shumaker, San Francisco.—p. 443.
Vertebral Involvement in Hodgkin's Disease: Report of Three Cases. Rieva Rosh, New York.—p. 454.
Diagnosis and Roentgen Treatment of Carcinoma of Head of Pancreas. E. A. Merritt and R. R. Rathbone, Washington, D. C.—p. 459.
Treatment of Some Infections by Means of Roentgen Ray. R. H. Stevens, Detroit.—p. 465.
Pulmonary Changes in Polycythemia Vera. I. S. Hirsch, New York.—p. 469.
March Foot or Pied Forcé. W. W. Furey, Chicago.—p. 474.
Zinc Filters: Note. R. S. Landauer, Highland Park, Ill.—p. 478.
Routine Roentgen Examinations of Chest of Patients Admitted to the State of Wisconsin General Hospital During a Three Months' Period. E. A. Pohle, L. W. Paul and W. H. Oatway Jr., Madison, Wis.—p. 480.
Some Lawsuits I Have Met and Some of the Lessons to Be Learned from Them (Eighth Instalment). I. S. Trostler, Chicago.—p. 485.

Roentgenologic Changes in Malacic Diseases of Bone.—Camp classifies the causes of malacic diseases of bone ("hyperparathyroidism") into atrophy, congenital defects, dietary insufficiency and avitaminosis, renal insufficiency, endocrine malfunction and miscellaneous conditions of unknown etiology. 1. Atrophy of bone, which results from disuse incident to trauma, fracture, arthritis, neurotrophic disorders or circulatory disease, is characterized by its limitation to the affected part. 2. In congenital defects are placed cases in which the bones are fragile because of a failure on the part of certain primitive cells to differentiate into their normal tissues. The basic defect appears to be an inability to form osteoblasts. The entire skeleton is affected. The bones have a bowed, misshapen, shortened and thickened appearance. Callus is easily detected in the shafts at the sites of fracture. Compression of the thorax and fracture of the ribs are common. Ossification in the skull is deficient and irregular. A bitemporal and occipital protuberance of the skull is common. 3. Rickets and osteomalacia constitute the lesions in dietary insufficiency and avitaminosis, which result from a deficient supply of calcium or phosphorus in the food or a deficient intake of vitamin D. There is little doubt that they are one and the same disease, except that rickets affects the growing child and osteomalacia the adult. In osteomalacia the significant roentgenologic changes consist of generalized osteoporosis, marked thinning of the cortical bone, with softening, bowing, fractures, kyphosis and generalized deformities. Of particular interest are the transverse osteoid zones, described by Looser, which simulate pathologic fractures. They usually occur in cases in which the disease is well advanced, and they have a tendency to be symmetrically distributed. Osteomalacia, especially the senile variety, is frequently confused roentgenologically with the skeletal changes of hyperparathyroidism. Cysts, however, do not occur in osteomalacia, and the transverse osteoid zones, which are so common in osteomalacia, are not observed in hyperparathyroidism. In doubtful cases blood chemistry and even biopsy of a bone may be necessary to distinguish osteomalacia from hyperparathyroidism. 4. Renal dwarfism occurs in children, in association with chronic renal insufficiency and apparently as a result of it. The stunting of growth and delayed union of epiphyses may be complicated by a rachitic process, which has all the clinical, roentgenologic and histologic characteristics of true rickets. Skeletal development is always retarded. There usually is something atypical: the lesions may be asymmetrical or different bones may be involved unequally. In cases of long duration there is a deep mottled zone at the ends of the long bones, which consists of osteoid tissue, cartilage, fibrous tissue and calcified matrix. Distortion, infractions and various deformities may result. In advanced cases the granular appearance more closely simulates the granular osteoporosis of hyperparathyroidism than does any other malacic disease of bone. In renal rickets the nephritis antedates the skeletal changes, whereas in hyperparathyroidism the skeletal changes usually antedate the nephritis. 5. Under endocrine dysfunction are hyperparathyroidism, hyperthyroidism, Cushing's syndrome, suprarenal disease, pancreatic disease and carcinoma of the pancreas and pancreatitis. 6. The miscellaneous conditions of unknown etiology include focal osteitis fibrosa cystica, osteitis deformans (Paget's disease), disease of the reticulo-endothelial system, Gaucher's disease and blood dyscrasias. Because of the multiplicity of conditions that may affect the mineral content and structure of the skeleton, the early recognition of any particular disease by roentgenograms alone may be exceedingly difficult.

Pathogenesis and Radiotherapy in Carcinoma of Thyroid.—According to Levin, in view of the pathogenesis and mode of formation of carcinoma of the thyroid, the therapy in the early stage of the disease is, in reality, the therapy of benign goiter. If evidence is found of proliferative activity, surgical removal should be followed by a course of radiotherapy over the operative field and also over the regions of the skeleton in which the skeletal metastases usually develop. In postoperative radiotherapy of carcinoma of the thyroid, the author employs radium in the operative field and high voltage roentgen therapy over the chest and skeleton. When the condition is in an advanced stage and a hard nodular tumor is present, invading diffusely the thyroid and firmly adherent to the underlying tissues of the neck, the treatment of choice is radiotherapy. The method consists in an incision over the tumor, a biopsy, and, depending on the size of the tumor, either buried gold seeds or the insertion of removable platinum needles. The objective is to destroy all the carcinomatous tissue, which must be accompanied by the destruction of the remnants of the normal thyroid tissue. As a result, there always develops a certain degree of myxedema. This complication proves that a good therapeutic result was obtained. Carcinoma of the thyroid functions in the same manner as a normal gland. Whenever such a myxedema disappears without treatment, it is an indication of either local recurrence or metastasis.

South Carolina Medical Assn. Journal, Greenville

32: 83-116 (April) 1936

Extradiabetic Uses of Insulin. R. Wilson Jr., Charleston.—p. 83.
Acute Laryngeal Stenosis in Children. E. W. Carpenter, Greenville.—p. 87.
Early Diagnosis of Chronic Arthritis. O. B. Chamberlain, Charleston.—p. 90.
Tumors of the Brain: Brief Review of Their Pathology. W. L. A. Wellbrock, Rochester, Minn.—p. 94.

Southern Surgeon, Atlanta, Ga.

5: 1-90 (Feb.) 1936

Empyema in Children. J. W. Bodley, Memphis, Tenn.—p. 1.
Conception and the Safe Period. G. F. Douglas, Birmingham, Ala.—p. 8.
Diagnosis and Treatment of Surgical Lesions of Pancreas. I. Abell, Louisville, Ky.—p. 22.
Uretero-Intestinal Anastomosis. L. G. Baggett, Atlanta.—p. 31.
Ephraim McDowell. E. Podolsky, Brooklyn.—p. 42.
Jaundice: Diagnosis, Treatment and Prognosis. R. L. Sanders, Memphis, Tenn.—p. 50.
Enterostomy. G. A. Hendon, Louisville, Ky.—p. 60.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Brain, London

59: 1-134 (March) 1936

The Newer Knowledge of Virus Diseases of Nervous System: Review and Interpretation. E. W. Hurst.—p. 1.
*Effects of Occipital Lobectomy on Vision in Chimpanzee. K. W. Spence and J. F. Fulton.—p. 35.
Cerebral Representation of Retina in the Chimpanzee. S. Poljak and R. Hayashi.—p. 51.
Pituitary-Hypothalamic Mechanism: Experimental Occlusion of Pituitary Stalk. W. Mahoney and D. Sheehan.—p. 61.
Effects of Lesions of Dorsal Column Nuclei in Macacus Rhesus. A. Ferraro and S. E. Barrera.—p. 76.
*Familial Schilder's Disease. A. Meyer and T. Tennent.—p. 100.
Physiologic Pathogenesis of Epilepsy. W. G. Lennox.—p. 113.
Anatomic Localization of Hypothalamic Center for Regulation of Temperature. C. H. Frazier, B. J. Alpers and F. H. Lewy.—p. 122.

Effects of Occipital Lobectomy on Vision in Chimpanzee.—Spence and Fulton subjected an adolescent chimpanzee to complete extirpation of the left occipital lobe and extirpation of the posterior and lateral portions of the area striata of the right hemisphere. The removal of the entire left area striata resulted in a slight but consistent loss in visual acuity ranging from approximately 5 to 15 per cent at four brightness levels. Following the second operation, which left the animal with only the anterior portion of the right area striata intact, there was complete failure to discriminate a pattern sixteen times as large as that discriminated in the preoperative tests. Rough testing of the visual fields suggested that a right homonymous hemianopia resulted from the first operation, while the second spared only the extreme left peripheral fields; i. e., the temporal halfmoon. The latter result supports the view that the occipital pole of the area striata represents the macular projection area and that the anterior portion of the area striata around the calcarine fissure is the cortical terminus of the extreme peripheral retinal elements.

Familial Schilder's Disease.—Meyer and Tennent present the clinical and pathologic records of two brothers suffering from Schilder's disease. Their mother is affected by a progressive spinal condition, the nature of which is still uncertain. Gastro-intestinal troubles preceded by a long interval the nervous disorder of the two brothers. These symptoms are also presented by a third brother who has slight ataxia. There were no histologic changes in the visceral organs to account for the condition of the central nervous system. The pathogenic and etiologic views on Schilder's disease are discussed in the light of the cases investigated. Consideration is given to the theory of primary glial disturbance with especial attention to the difficulties of interpretation of the histologic data. The peculiar distribution of the process in the optic tract is described. It was similar to that described by Scherer in a spontaneous disease in monkeys. The nosologic significance of these symptoms and of "honeycombed" patches, which are found also in Schilder's disease, is discussed as to its broader aspects.

British Journal of Children's Diseases, London

33: 1-84 (Jan.-March) 1936

Farrago Pyretologica: Medley on Fevers. J. D. Rolleston.—p. 1.
Mantoux Test in Children, with Especial Reference to Home Contacts. G. G. Kayne.—p. 20.
*Chronic Jaundice in Three Brothers with Hypertrophic Cirrhosis of Liver and Infantilism. A. Chand.—p. 31.
Seventeenth Century Cure for Rickets. W. J. Rutherfurd.—p. 40.

Chronic Jaundice and Hypertrophic Cirrhosis of Liver and Infantilism.—Chand gives the details of three cases of chronic jaundice with hypertrophic cirrhosis of the liver and infantilism in blood brothers. Two of them are alive and the third, the eldest, has since died. The clinical features tally in almost all respects with those of Hanot's cirrhosis and cannot be accounted for by conditions like Banti's disease, acholuric jaundice and chronic infective cholangeitis, with or without ordinary cirrhosis. In the patient who died, signs and symptoms of portal cirrhosis appeared in addition to those of biliary cirrhosis a few months before death. Biopsy or necropsy could not be done to study the pathologic changes of the disease.

British Journal of Physical Medicine, London

10: 183-204 (March) 1936

Histamine Injections in Chronic Rheumatism. B. Shanson.—p. 185.
The Use of Histamine in Rheumatism. F. S. Mackenna.—p. 187.
Evening's Work in an Ultraviolet Radiation Clinic. Mary E. Ormsby.—p. 190.
Gold Treatment in Arthritis. Doris M. Baker.—p. 192.
Red Light Therapy in Schizophrenia. D. E. Cameron.—p. 193.
Physiotherapy in Endocrinology. F. R. B. Atkinson.—p. 196.

British Medical Journal, London

1: 457-514 (March 7) 1936

Ciliary (Migrainous) Neuralgia and Its Treatment. W. Harris.—p. 457.
Pulmonary Trauma. W. E. Cooke.—p. 461.
Dermoid Cysts and Teratomas of Mediastinum. P. J. Moir.—p. 463.
*Neonatal Dermatitis. H. Carter and H. A. Osborn.—p. 465.
Dysphagia Due to Unilateral Pulmonary Fibrosis. A. T. Doig.—p. 469.

Neonatal Dermatitis.—Carter and Osborn state that "pemphigus neonatorum" is a contagious, subepithelial dermatitis, with an incubation period of one or two days. The lesion is situated under the epidermis and tends to spread centrifugally unless a reliable antiseptic is brought into immediate contact with the infecting organism. As the source of the outbreak may be difficult to find, the disease tends to become epidemic. In a maternity unit in which this disease is endemic, irregular waves occur in the graph of the cases; the number of cases increases with rush work in the department and drops in the quiet periods. The elimination of the source of infection is the ideal and only sound method of checking an outbreak. The disappearance of cases of folliculitis at the same time as those of pemphigus suggested that the etiology is somewhat similar, and histologic sections showed that the lesion of pemphigus was subepithelial and therefore more dangerous. It should be possible by early diagnosis and intelligent and effective treatment to lower and practically to abolish the mortality of the disease. The presence of pemphigus in a maternity unit is an indication that there is a septic focus in or associated with that department, and the septic focus should be found and eradicated. In the outbreak of pemphigus at Mill Road Infirmary at least seventeen strains of Staphylococcus aureus and two of Staphylococcus citreus were found. Pemphigus neonatorum should have only one phase, that of the small unbroken blister. If treatment by silver nitrate is followed, subsequent phases should not occur. The authors are convinced that this disease is not an acute infective fever but merely a local subepithelial dermatitis, and that local treatment can abort it. They protest against the totally erroneous dogma that fatal cases are doomed from the onset. Fatal cases are due to late diagnosis and inefficient treatment.

1: 515-566 (March 14) 1936

Medical Facts and Fallacies. M. E. Shaw.—p. 515.
Nonspirochetal Infectious Jaundice. R. Bates.—p. 521.
Human Tuberculosis of Bovine Origin in Staffordshire. A. S. Griffith and J. Menton.—p. 524.
Glycosuria of "Lag Storage" Type: Explanation. R. D. Lawrence.—p. 526.
Testosterone. R. Deanesly and A. S. Parkes.—p. 527.
*Chronic Lead Poisoning Due to Theatrical Grease Paint. E. L. Bartleman and C. Dukes.—p. 528.

Lead Poisoning Due to Theatrical Grease Paint.—Bartleman and Dukes report the case of a young actress who developed the classic symptoms of lead poisoning. Blood examination revealed anemia and stippled red cells. The diagnosis was confirmed by the finding of large quantities of lead in the urine and feces. The source of the lead poisoning was traced to the use of a grease paint containing approximately 40 per cent of lead. Traces of lead may be found in the urine of healthy people. This is due to the fact that small quantities of lead are ingested with such food as sausages, meat, beans, cherries and other fruit. This being so, it is obviously unsafe to base a diagnosis of lead poisoning on the discovery of lead in the urine unless this is estimated quantitatively and found to be far above the normal limits. Actually in lead poisoning the patient usually excretes at least 0.1 to 0.3 mg. of lead per liter, and, when figures such as these are reached, there is strong evidence for lead poisoning. In the present patient the quantity of lead excreted was more than ten times the normal, so that the test provided confirmatory evidence. However, in view of the pitfalls that may beset diagnosis by urine

tests it is important to recollect the paramount importance of the clinical history and blood picture. The stippled red blood cell is easily recognized in a Leishman-stained film. Anemia in association with a high stippled red cell count should always suggest lead poisoning. The two conditions in which the blood picture mostly resembles lead poisoning are acholuric jaundice and chronic malaria, in both of which the reticulocyte count is commonly higher than normal. There is a great variability in susceptibility to lead poisoning. The grease paint used by the patient was the same brand as that used by several other members of the cast, but so far no other case of lead poisoning occurred. There were, however, a good deal of ill health and complaints of tiredness and headaches among those of the cast who had used this grease paint previously.

1: 567-624 (March 21) 1936

Oxygen Tents and Nasal Catheters. E. P. Poulton, assisted by T. W. Adams.—p. 567.
Comparison of Cultural Methods for Routine Diphtheria Diagnosis. J. D. A. Gray and Doris M. Stone.—p. 572.
*Treatment of Bacillus Coli Pyelitis with Alkalis. A. A. Osman.—p. 575.
Control of Hemorrhage in Endoscopic Prostatic Resection: Note on Clot Retention. E. W. Riches.—p. 578.
Indications for Surgery in Severe Bell's Palsy. A. Tumarkin.—p. 580.
Derotation of Tibia. R. I. Stirling.—p. 581.

Treatment of Bacillus Coli Pyelitis with Alkalis.—Osman declares that the successful treatment of Bacillus coli pyelitis with alkalis depends chiefly on careful attention to detail: essential factors in the method are the production of a copious diuresis and a sufficiently alkaline urine. Clinical trials show that neither alone is effective, though the mechanical flushing out of the urinary passages is probably the more important of the two. A certain degree of alkalinity of the urine tends to inhibit the growth of Bacillus coli-communis, though it may flourish sometimes in exceedingly alkaline urines, especially in vitro. Recent observations suggest that inhibition of growth of the bacilli is more satisfactorily accomplished when the urine has been rendered unusually acid, as with a ketogenic diet. But the precise significance of the reaction of the urine in relation to the growth, or inhibition of growth, is not yet known. Alkaline therapy can be continued indefinitely without harm to the individual or serious interference with the activities of a normal existence; it permits of a normal diet being taken, and, above all, it confers protection against relapses so long as it is conscientiously carried out. Nevertheless, it is of little use in cases with increasing urinary obstruction, as in the later stages of pregnancy, or in cases in which mechanical deformities of the renal pelvis or ureters cause stagnation of urine. It is of doubtful value, therefore, in cases with chronic ulceration and scarring of the renal pelvis, neuromuscular incoordination or congenital anatomic defects of the pelves or ureters. Such cases can be cured only, if at all, by inhibiting the growth of the localized bacilli, and it is in these cases that the ketogenic diet or mandelic acid should be tried.

East African Medical Journal, Nairobi

12: 357-386 (March) 1936

Certification of Mental Disorder in Kenya. H. L. Gordon.—p. 358.
Poisonous Effects of Some Local Species of Euphorbia. W. D. Raymond.—p. 369.

Edinburgh Medical Journal

43: 217-280 (April) 1936

Clinical Recollections and Reflections: I. The Epileptic Fit and the Epilepsies. E. Bramwell.—p. 220.
*Experimental Glomerulonephritis Produced by Use of Specific Serums. W. M. Arnott, R. J. Kellar and G. D. Matthew.—p. 233.
Paroxysmal Auricular Tachycardia Associated with Primary Cardiac Tumor. A. R. Gilchrist, with pathologic report by W. G. Millar.—p. 243.
Crowd Psychology as Modern Menace: Medicosociological Study. A. J. Brock.—p. 259.

Glomerulonephritis Produced by Specific Serums.—Arnott and his associates repeated the experimental production of glomerulonephritis in rabbits in accordance with Masugi's method. They deal principally with the histologic observations in their first group of animals subjected to injections of antiserum. They anesthetized rabbits of varying breeds with ether, opened the abdomen, cannulated the renal artery on each side and perfused the organs with sterile saline solution until free of blood. The kidneys were then removed and ground in a mortar. Physiologic solution of sodium chloride was added in sufficient quantity to give a final suspension of from 10 to 30 per cent. Subsequently the suspension was injected intraperitoneally in 10 cc. doses into Aylesbury ducks. This procedure was repeated at intervals of from four to five days on from twenty-five to forty occasions. At the end of this period each duck was anesthetized and the sternum removed. With a wide bore needle as much blood as possible was aspirated from the right ventricle. The blood serum was heated to 56 C. for thirty minutes in order to eliminate natural complement and was then ready for use. The results show that a serum prepared in the foregoing manner causes a glomerulonephritis similar histologically, in all essential features, to human glomerulonephritis. Clinically there is also great similarity, even to the production of hypertension, although the latter point has not yet been established as blood pressure observations were carried out in only one animal. This point is the subject of further research. Further research is also being carried out on the effect of serum prepared by repeated injections of liver tissue. Masugi, working with rats and rabbits, claimed that such a serum caused specific damage to the vessels of the liver, while it did not damage the kidney. The demonstration of an organ specificity in this immune serum would in itself be a matter of considerable importance, as this possibility is generally regarded as unlikely. An immune serum with little or no tissue specificity might cause almost exclusively glomerular damage, because the glomerular capillaries pass through their walls far more diffusible substances than any other group of capillaries in the body. The one point of contact so far established between the mechanism of human glomerulonephritis and that of this experimental glomerulonephritis is the fact that the human disease seems to occur in cases of streptococcic infection in which there is a vigorous antibody response resulting in an unusually intense antigen-antibody reaction while, in the experimental lesion, there is undoubtedly an intense antigen-antibody reaction occurring in the rabbit.

Glasgow Medical Journal

7: 97-152 (March) 1936

Otosclerosis, Hereditary Congenital Deafness and Senile Deafness, with Especial Reference to Their Pathologic Differentiation. A. A. Gray.—p. 97.
The Later Results of Operations on Stomach and Duodenum. R. Mailer.—p. 109.

Indian Medical Gazette, Calcutta

71: 121-180 (March) 1936

Etiology of Blackwater Fever. K. V. Krishnan and N. G. Pai.—p. 121.
Atabrine Plasmochin in Treatment of Malaria. D. Manson.—p. 127.
Mass Treatment with Injectable Atabrine. A. T. W. Simeons.—p. 132.
Rheumatic Heart Disease in Bombay Deccan. L. B. Carruthers.—p. 137.
*Prognostic Value of Variation in the Arneth Count in Cases of Asthma Treated with Autovaccine. L. E. Napier and Dharmendra.—p. 139.
Iron Encephalopathy: Case. L. E. Napier.—p. 143.
Injuries of Skull. H. Smith, with notes on head injuries by P. N. Ray.—p. 145.

Prognostic Value of Variation in Arneth Count in Cases of Asthma Treated with Autovaccine.—Napier and Dharmendra discuss the changes in the Arneth counts produced by means of treatment with autovaccine in twenty-five cases of asthma. A vaccine made from the organisms isolated from the sputum was used and a course of six injections was given. The first count was done on admission of the patient to the hospital and the second about two days after the last dose of the vaccine. The Arneth count on the first occasion showed a marked shift to the left. At the second examination the count showed an even more marked shift to the left in three cases, no change in two cases and a decrease in the shift, either slight or marked, in twenty cases. When the variations in the Arneth count on the two occasions are correlated, the relation between the improvement in the condition of the patient and the improvement in the shift to the left in the count becomes prognostic. The initial Arneth count gives little information about the results to be expected from vaccine treatment. The Arneth count after the treatment gives some information on this point. The fall of the Arneth index below 80 seems to

be a favorable prognostic sign. The extent of fall in the index after the treatment gives the most information regarding the prognosis. Among the cases not responding favorably to the treatment, the index sometimes rises and in no case shows a marked fall. In the cases showing temporary improvement, the fall in the index never exceeded 10 points. A fall of 10 or more in the Arneth index after the treatment with autovaccine is a good prognostic sign.

Irish Journal of Medical Science, Dublin

No. **123**: 97-144 (March) 1936

Some Selections from the Transactions of the Cork Medical Society, 1854-1863. R. C. Cummins.—p. 97.
Dysmenorrhea: The Oldest Theories and the Newest Treatment. D. J. Cannon.—p. 108.
Enucleation of Pleural Adhesions by Open Operation. A. B. Clery.—p. 122.
Epidemiology of Typhus Fever: Note. M. P. O'Connor.—p. 128.
Thyrotoxicosis Complicating Pregnancy: Case. O. Browne.—p. 133.

Journal of Neurology and Psychopathology, London

16: 193-288 (Jan.) 1936

Mescalin and Depersonalization: Therapeutic Experiments. E. Guttmann and W. S. Maclay.—p. 193.
Effective Use of Small Nondehydrating Doses of Epsom Salt in Epilepsy: Study of One Hundred and Nine Cases. A. Wolf.—p. 213.
Nonalcoholic Polyneuritis Associated with Korsakow Syndrome. L. Minski.—p. 219.
Survey of Patients in Large Mental Hospital. A. G. Duncan, L. S. Penrose and R. C. Turnbull.—p. 225.
Recent Advances in Therapeutic (Induced) Malaria. G. de M. Rudolf.—p. 239.

Journal of Pathology and Bacteriology, Edinburgh

42: 329-540 (March) 1936

Experimental Production of Chloride Retention by Means of Pneumococcic and Other Infections. J. W. S. Blacklock and N. Morris.—p. 329.
Diphtheria Carriers, with References to Types of Corynebacterium Diphtheriae: Note. May H. Christison, Helen A. Wright and Barbara J. Shearer.—p. 345.
Production of Toxin by Bacillus Edematis-Maligni (Vibrion Septique). L. E. Walbum and G. C. Reymann.—p. 351.
Observations Relating to Psychosin Sulfate: Its Action on Bacteria, Toxins, Serum and Red Blood Cells. A. N. Drury, J. A. R. Miles, A. E. Platt, G. Plaut and H. Weil, with note on surface properties of psychosin derivatives by A. R. Hughes.—p. 363.
Homiografting of Rat Pituitary Grown in Vitro. W. Haymaker and Evelyn Anderson.—p. 399.
Histogenesis of Neural Tissue in Teratomas. R. A. Willis.—p. 411.
*Rôle of Bacillus and of "Hetero-Allergy" in Tuberculous Liquefaction. W. Pagel.—p. 417.
Bronchiectasis and Metaplasia in Lung of Laboratory Rat. R. D. Passey, A. Leese and J. C. Knox.—p. 425.
Comparison of Certain Mediums for Cultivation of Tubercle Bacilli from Sputum. S. R. Jamieson.—p. 435.
Intensification of Voges-Proskauer Reaction by Addition of α-Naphthol. M. M. Barritt.—p. 441.
Use of Brilliant Green-Eosin Agar and Sodium Tetrathionate Broth for Isolation of Organisms of Typhoid Group. E. R. Jones.—p. 455.
Inapparent (Subclinical) Infection of Rat with Virus of Infectious Ectromelia of Mice. F. M. Burnet and Dora Lush.—p. 469.
Factor in Culture Filtrates of Certain Pathogenic Bacteria Which Increases Permeability of Tissues. D. McClean.—p. 477.

Rôle of Bacillus and of "Hetero-Allergy" in Tuberculous Liquefaction.—Pagel is of the opinion that tuberculous liquefaction is an allergic phenomenon. The presence of bacillary bodies is necessary for its development, for these, as an antigenic irritant, give rise to the allergic reaction. The allergic reaction that causes liquefaction of the implanted material seems to be closely connected with tuberculous hypersensitiveness, such as occurs in Koch's phenomenon. It is justifiable to assume that the early stage of tuberculous liquefaction in man follows an increase in the number of bacilli; this provides the irritant requisite for the allergic reaction. The foreign body reaction occurs earlier in tuberculous than in normal animals. In tuberculous hypersensitive animals, moreover, the introduction of an artificial substitute for dead tissue, without tubercle bacilli but containing such substances as develop during their growth in glycerin broth, causes within from four to six days the formation of a granulomatous lesion with giant cells of the Langhans type, which corresponds to an allergic modification of the foreign body reaction (hetero-allergic reaction). These features are absent in the impetuous allergic reaction that occurs in response to the injection of an artificial substitute for tissue but containing also bacilli. Increase in the protein content of the injected material generally gives similar results. Exceptional hyperergic reaction to the filtrate is a hetero-allergic phenomenon, as proved by the injection of pure protein mixed with glycerin broth. Hetero-allergic reactions in the model experiment do not give any information as to the production of liquefaction by specific substances in the tissues of tuberculous foci, or as to the part played by hetero-allergy in tuberculous liquefaction of man.

Journal of Tropical Medicine and Hygiene, London

39: 53-64 (March 2) 1936

The Anemia Problem, with Especial Reference to Pernicious Anemia: Therapeutic Critique. E. A. Sharp.—p. 53.
Quantitative Estimation of Glucose by Biologic Methods. M. Douglas.—p. 57.

39: 65-76 (March 16) 1936

The Anemia Problem, with Especial Reference to Pernicious Anemia: A Therapeutic Critique. E. A. Sharp.—p. 65.
Cellular Reaction to Bacillus Leprae. E. Muir.—p. 70.

Lancet, London

1: 521-582 (March 7) 1936

Some Observations on Peptic Ulcer. D. T. Davies.—p. 521.
Further Observations on Rôle of Toxin in Staphylococcic Infection. F. C. O. Valentine.—p. 526.
Operation for Femoral Hernia by a Midline Extraperitoneal Approach: Preliminary Note on Use of This Route for Reducible Inguinal Hernia. A. K. Henry.—p. 531.
*Temporary Paralysis of Diaphragm in Treatment of Pulmonary Tuberculosis. L. O'Shaughnessy and J. H. Crawford.—p. 534.
Accidental Transmission of Malaria by Blood Transfusion. W. L. Thomas and S. Keys, with note by S. C. Dyke.—p. 536.

Paralysis of Diaphragm in Treatment of Tuberculosis.—O'Shaughnessy and Crawford do not consider phrenic evulsion, discreetly and carefully performed, a dangerous operation but have adopted phrenicothlasty, the procedure of which is described, on quite other grounds. They have observed an increasing number of patients with bilateral phthisis for whom some form of bilateral collapse operation would offer a prospect and the only prospect of cure, but a paralyzed diaphragm has ruled out such a possibility. In the young patient a paralyzed hemidiaphragm does not produce signs of respiratory distress. But it has been suggested recently that in middle age paresis of the diaphragm may constitute a more serious handicap: Kochs found that phrenicotomy produced a greater reduction of vital capacity in middle aged than in young patients. The possible detrimental effects of the paralysis on cardiovascular function in later life must also be borne in mind, and the recent experiments of Nissen and Wustmann on the effect of diaphragmatic movement on the caval blood flow are of interest in this connection. The authors therefore believe that it is of probable advantage for the patient to have a healed tuberculous lesion and a moving diaphragm; for, should the lesion again become active, the patient is a suitable subject for any form of treatment that may be necessary, and if, on the other hand, the disease remains permanently arrested, there is no chance of his having to pay for this benefit by an impairment of respiratory or cardiovascular function in later life.

1: 583-642 (March 14) 1936

Nutrition Question. R. Hutchison.—p. 583.
Some Observations on Peptic Ulcer. D. T. Davies.—p. 585.
*Skin Affections Underlying Pruritus of Vulva and Anus: Review of Three Hundred Cases. Elizabeth Hunt.—p. 592.
Methylene Dichloride Intoxication in Industry: Report of Two Cases. H. Collier.—p. 594.
*Intraspinal Injection of Alcohol for Intractable Pain. W. R. Russell.—p. 595.
Treatment of Ancylostomiasis in Indian Seamen. A. H. Walters, under the direction of G. C. Low and P. H. Manson-Bahr.—p. 599.
Technic of Intravenous Anesthesia. R. Jarman and A. L. Abel.—p. 600.

Skin Disorders Underlying Pruritus of Vulva and Anus.—According to Hunt, the diagnosis of a disorder of the skin, when it is localized on or around the external genitalia and anus, may be and often is extraordinarily difficult, for the distinctive characters of the eruptions are wont to be modified in this moist warm area, and it is sometimes only by the discovery of typical lesions at other sites that the diagnosis can

be made with confidence. The need for accurate diagnosis and for the differentiation of the various skin disorders that may give rise to vulval and anal irritation must be apparent not merely for the purposes of treatment but also for the reassurance of the patient and for guidance in avoiding recurrences. An analysis of 300 cases of pruritus falls into seven groups: general disorders of the skin (lichen planus, seborrheic dermatitis, psoriasis, eczema and leukodermia), dermatitis traumatica and venenata, local causes, parasites, general constitutional diseases, psychic and miscellaneous (lichenoid eruption, senile pruritus and hygienic laxity). The most striking feature was the large number of cases presenting well known disorders of the skin, and in particular the excessive proportion of cases of lichen planus—an eruption that may affect skin and mucous membrane and usually stated to occur rarely on the vulva.

Intraspinal Injection of Alcohol for Intractable Pain.—During the last eighteen months Russell has used the intraspinal injection of alcohol in attempting to relieve severe pain in eighteen cases, and in several of these the result of the injection has been satisfactory. The dangers of the injection, the technic for the relief of sacral pain and the method of relieving lumbar or thoracic pain are discussed. In the cases treated the injections given were in many instances larger than those advised. The first injections were small (0.5 cc.) but had no effect in relieving severe pain; hence in cases of advanced cancer the author has given injections of 1 cc. or more. Most of the patients treated had advanced malignant disease, and most were in the cancer wards of a hospital for patients with incurable diseases.

Medical Journal of Australia, Sydney

1: 253-282 (Feb. 22) 1936

Tuberculosis Survey of a Papuan Village. F. W. Clements.—p. 253.
The Educational Aspect of Deafness. H. Earlam.—p. 259.
Treatment of Familial Acholuric Jaundice. S. O. Cowen.—p. 265.
Brucella Infections: Frequency of Agglutinins for Brucella Abortus in the Population at Large. A. E. Platt.—p. 268.
Occurrence of Gravis Type of Diphtheria Bacillus in Victoria. T. S. Gregory.—p. 269.

1: 283-316 (Feb. 29) 1936

Survey of Incidence of Taenia Saginata Infestation in the Population of the State of Victoria from January 1934 to July 1935. W. J. Penfold, H. B. Penfold and Mary Phillips.—p. 283.
Fracture of the Leg Below the Knee. H. S. Stacy.—p. 285.
Fetal Death. C. A. C. Leggett.—p. 288.
Psychoanalysis and General Practice. R. C. Winn.—p. 293.
The Oath of Hippocrates and Its Use at the Present Day. J. G. Avery.—p. 299.

1: 317-350 (March 7) 1936

Diagnosis of Taenia Saginata Infestation. W. J. Penfold and H. B. Penfold.—p. 317.
Regional Ileitis: Report of Case. K. Ross.—p. 321.
Contributions of Psychoanalysis to General Medicine. R. C. Winn.—p. 323.
Australian Typhus: Report of Fatal Case. J. C. Hughes, O. A. Diethelm and A. H. Tebbutt.—p. 327.

Medical Press and Circular, London

192: 293-314 (April 1) 1936

Physiologic Basis for Modern Treatment of Fractures. A. L. d'Abreu.—p. 299.
Some Clinical Aspects of Carcinoma. R. S. Woods.—p. 302.
*Hypervitaminosis as Cause of Ill Health in Country Children. W. A. Ball.—p. 303.
Progress and Problems. W. M. Eccles.—p. 304.

Hypervitaminosis in Country Children.—Ball discusses the occurrence of cases which in towns are deficiency diseases but which occur in the country in the opposite type of patient. Three types of case (anemia, phlyctenular conjunctivitis and debility) are differentiated from the clinical point of view. The patients usually respond to an increase in the carbohydrates in the form of sweets and cakes, and diminution, or even absence, of vitamins in the form of cod liver oil and fresh fruit. The children that were reared in the best conditions were often of poor type, while those who were reared on a definitely deficient diet were healthy and rosy cheeked. In this series of cases the three types of patients that are successfully treated in towns with sunshine and an increase of vitamins were successfully treated in the country with the exactly opposite treatment. It would seem that an excess of vitamins can bring about the same clinical picture as a lack, and this stresses the danger of indiscriminate dosing with cod liver oil and the like.

South African Medical Journal, Cape Town

10: 119-166 (Feb. 22) 1936

To the Newly Qualified. A. Cox.—p. 119.
The Education of Medical Men. P. M. Latham.—p. 121.

Tubercle, London

17: 289-336 (April) 1936

The Aftercare of the Tuberculous in London. N. D. Bardswell.—p. 289.
Id. L. C. Marx.—p. 294.
Id. J. G. Johnstone.—p. 297.
Report of Postmortem Examination of Apicolysis. F. A. H. Simmonds.—p. 307.
Value of Roentgen Rays in Diagnosis of Renal Tuberculosis. C. G. Sutherland and W. F. Braasch.—p. 309.

Chinese Medical Journal, Peiping

50: 97-200 (Feb.) 1936

Decompression of Gastro-Intestinal Tract: I. Use of Certain Simple Mechanical Appliances for Control of Abdominal Distention. H. H. Loucks and H. C. Fang.—p. 97.
*Tubal Factor in Sterility Among Chinese Women. G. King.—p. 111.
Isolation of Treponema Pallidum from Gumma of Skeletal Muscle: Report of Four Cases Observed in North China. C. K. Hu and H. C. Li.—p. 123.

Tubal Factor in Sterility Among Chinese Women.—King investigated 272 cases of sterility in Chinese women by means of uterotubal insufflation, using air or carbon dioxide. There were 165 instances of primary and 107 of secondary sterility. The result of insufflation depended to a certain extent on the method used. Normal tubal patency and absolute tubal nonpatency could be demonstrated with equal ease by either method, but impaired patency associated with tubal spasm, stricture or stenosis could not be clearly differentiated by the simple air insufflation method, whereas it was plainly shown by the kymographic method. Chronic inflammatory disease of the tubes was responsible for practically all cases of impaired patency or complete nonpatency. The gonococcus was comparatively rarely obtained in smears, owing to the chronicity of most of the cases. In the majority of the cases of nonpatency, however, there was a history suggestive of gonococcic infection in either the patient or her husband, commonly in both. Tubal insufflation possesses therapeutic as well as diagnostic value. Pregnancy is known to have occurred in sixteen patients following insufflation. Since only between 30 and 40 per cent of all cases of insufflation could be followed up, the actual incidence of pregnancy in the series must be higher than this.

Japanese Journal of Experimental Medicine, Tokyo

14: 1-84 (Feb. 20) 1936

Studies on Skin Reaction Caused by Schistosoma Japonicum, Cutaneously Applied on Animals. J. Watarai.—p. 1.
Investigations on Rapidity of Motility of Bacteria. K. Ôgiuti.—p. 19.
Studies on Mode of Development of Bacteria in Single Cell Culture on Film of Medium: I. Observations on Mode of Development on Mycobacterium and Biologic Meaning of Its Granules. K. Hu.—p. 29.
Id.: II. Observations on Mode of Development of Diphtheria Bacilli. K. Hu.—p. 59.
Id.: III. Observations on Mode of Development of S and R Forms of Bacteria. K. Hu.—p. 67.
Ultrafiltration Experiments on Virus of Rabies (Virus Fixe). H. Yaoi, K. Kanazawa and K. Sato.—p. 73.
New Cestode Species, Amphilina Japonica. S. Goto and N. Ishii.—p. 81.

Journal of Oriental Medicine, Dairen, South Manchuria

24: 15-30 (Feb.) 1936

Pathologic-Anatomic and Pathologic-Histologic Studies of Kala-Azar. Mo Ten Sei.—p. 15.
Influence of Sympathetic Nervous System in Experimental Production of Hyperplasia of Intima of Arteries. Kan-Jin-Nan.—p. 17.
Development of Mast Cells in Organs of Oral Cavity and in Tissues of Normal Rat. K. Imanishi.—p. 18.
History of Bacteria Artificially Introduced into the Body and Factors of Infection: Report V. Ability of Tubercle Bacilli to Pass Through the Kidneys of Healthy and Morbid Rabbits, and Significance of Cold in Experimental Renal Tuberculosis. N. Nishikawa.—p. 20.
Avian Pygomelus. T. Hosaka.—p. 21.
Statistical Observation on Measles in Dairen. Y. Morita.—p. 22.
Sensitivity of Suprarenalectomized White Rats to Cyanide, Morphine, Tribrom-Ethanol and Histamine Following Administration of Suprarenal Substance and Sulfur. M. Hashimoto.—p. 23.
Lower Jaw in Chinese Children; Various Masses and Indexes. H. Sakai.—p. 24.
Experimental Studies of Blood Transfusion on Blood Pictures. M. Okamoto.—p. 26.
Clinical Studies of Blood Transfusion on Blood Pictures. M. Okamoto.—p. 27.
Nucleus Fastigii of Cerebellum: Experimental Study. S. Ushijima.—p. 28.

Annales de Dermatologie et de Syphiligraphie, Paris

7: 225-336 (March) 1936

Painful Nodule of Ear. W. Dubreuilh.—p. 225.
*Chrysocyanosis (Cutaneous Pigmentation After Injection of Gold Salts). F. Cardis and M. Conte.—p. 229.
Larval Form of Acne Conglobata in Patient with Hyperthyroidism, Acromegaly and Probable Hypophyseal Tumor. P. Pinetti.—p. 245.
Tuberculin Drop Method as Diagnostic Method. M. J. Goutina.—p. 262.

Pigmentation of Skin Following Gold Treatment.—The pigmentation of the skin occurring in the course of gold treatment is, according to Cardis and Conte, a relatively new disorder. Age appears to have no influence on its appearance, but it is much more common in women than in men. The nature of the gold salt is relatively immaterial, but the dose is important since the cutaneous pigmentation has generally appeared after enormous doses. It is more common in blondes than in brunettes. As a rule, the onset is insidious and progressive and difficult to determine. In general, it appears after one or two years of gold therapy. The pigmentation affects especially the eyes and the face. The degree of pigmentation varies from day to day. It develops almost always either toward a stationary position or a progressive aggravation. Examination of a fragment of skin has been performed in three instances to the knowledge of the authors. Small grains of gold have been found in the pigmented skin. Small plaques of histiocytes with pale nuclei and innumerable granulations have been found in the spleen. Other viscera have been found similarly infiltrated with gold. No certain treatment is yet known. The authors conclude that it is wise to avoid large doses of gold, especially in blonde women, who are particularly susceptible.

Schweizerische medizinische Wochenschrift, Basel

66: 349-372 (April 11) 1936. Partial Index

Lymphatic Apparatus. E. Ludwig.—p. 349.
New Ergot Alkaloid. A. Stoll and E. Burckhardt.—p. 353.
*Genesis of Air, Sea and Train Sickness in New Light. K. Lenggenhager.—p. 354.
Etiology and Therapy of So-Called Anal Fistula (Chronic Purulent Anal Thrombophlebitis). R. Baumann and K. Blond.—p. 358.

Air, Sea and Train Sickness.—Lenggenhager cites observations and experiments which indicate that sea, air and train sickness is not caused by the labyrinth but by the fluctuations in the pressure and traction exerted on the large nerve plexuses of the sympathetic system in the epigastric region. Regarding the treatment he says: 1. The horizontal position of the body greatly protects against sea or air sickness. 2. An empty stomach and small intestine reduce the shifting and pressure changes in the viscera. To be sure, this advantage is interfered with by the fact that a newly filled stomach produces a pleasant drowsiness (reduced sensitivity of the nervous system). The latter factor explains why persons on a sea voyage usually feel well shortly after eating. 3. Strong lacing of the abdomen slightly reduces the shifting of the viscera. 4. Substances that have a paralyzing effect on the nerves inhibit sea sickness. However, since irritation of the vagus is not the only cause of sea sickness, combination preparations are advisable.

Riforma Medica, Naples

52: 495-528 (April 11) 1936

*Eleomas and Subcutaneous Lipoid Necrosis. E. Repetto.—p. 495.
Syphilitic Myocarditis. L. Lami.—p. 500.

Eleomas and Subcutaneous Lipoid Necrosis. — Repetto reports a case of subcutaneous eleomas following subcutaneous injections of camphor in oil. The patient never had syphilis, tuberculosis or local pyogenous infection that could be considered predisposing factors for the development of the tumors. Because of the analogy that exists between subcutaneous lipoid necrosis and subcutaneous eleomas in their clinical evolution and histologic picture, the author believes that eleomas are a type of subcutaneous lipoid necrosis. The oil may act in these cases as a local traumatic factor that favors the development of the tumors, which is due to endocrine disturbances. In the author's case the evolution of the tumors was intensified during menstruation. This fact in an obese patient indicated a possible relation between the endocrine disturbances, especially ovarian and thyroid disorders in his case, and the development of the subcutaneous lipoid tumors.

Archiv für Verdauungs-Krankheiten, Berlin

59: 129-300 (April) 1936. Partial Index

*Studies on Rational Permanent Treatment of Pernicious Anemia. N. Henning and H. Keilhack.—p. 129.
Studies on Digestion of Cellulose: New Method for Quantitative Determination of Cellulose and Its Use in Physiology of Digestion. A. Schmidt-Ott.—p. 143.
Experimental and Clinical Investigations on Porphyrin. L. Lorente and H. Scholderer.—p. 188.
Significance of Catalase (and Triboulet) Reaction for Diagnosis and Prognosis of Intestinal Diseases. S. Kemp and T. Thune Andersen. C'cn.—p. 219.

Rational Treatment of Pernicious Anemia. — Henning and Keilhack point out that the usual liver and stomach therapy has some disadvantages. If liver is given constantly, the patients develop an aversion to its taste, and the same applies to the liver and stomach preparations. The injection treatment is likewise unsuitable for permanent treatment. The chief aims that are to be realized in the continuous treatment of pernicious anemia is that the treatment is not too expensive, that it can be carried out by oral medication and that no aversion develops in case of continued use. In order to realize these aims the authors made further studies on Castle's intrinsic and extrinsic factors. The fact that the intrinsic factor is produced by the glands of the antrum permitted a considerable reduction in the quantity of stomach extract that is necessary for effective treatment. Instead of giving from 30 to 50 Gm. of stomach extract, they found that 5 Gm. of a powder prepared from the mucous membrane of the antrum was sufficient when it was combined with the necessary amount of extrinsic factor. It was also determined that the extrinsic factor does not have to be meat but may be vegetable protein. A preparation that combines the intrinsic factor in the form of antrum extract and the extrinsic factor in the form of vegetable protein was found effective in nine cases of pernicious anemia. Control tests indicated that only the combination of these two substances acts in the manner indicated by Castle's theory. The small amount of organ extract practically eliminates the problem of a possible aversion of the patient toward the treatment.

Jahrbuch für Kinderheilkunde, Berlin

146: 233-292 (April) 1936. Partial Index

Protective Skin Reflexes. A. Peiper.—p. 233.
*Diagnostic Differentiation of Epilepsy in Children from Pyknolepsy and Salaam Convulsions. Ursula Moeller.—p. 240.
Influence of Pure Vitamin Preparations on Course of Tuberculosis in Guinea-Pigs. R. Stadler and E. Larisch.—p. 253.
Brittleness of Bones in Syphilitic Nursling. W. Mikułowski.—p. 274.

Differential Diagnosis of Epilepsy.—Moeller cites methods that have been tried to differentiate the types of convulsions occurring in children. She employed the hyperventilation method, injection of solution of posterior pituitary and alkalization (by means of potassium sodium citrate, until an alkaline reaction of the urine had been obtained). She resorted to these methods in 121 children who had attacks of convulsions. In seventy-eight of these children none of the three methods elicited convulsions. Some of these children were not subject to attacks in the course of their stay at the clinic, but the anamnesis disclosed that they had had convulsions, whereas in others the convulsions were sequels of encephalitis or were caused by a toxic hydrocephalus, cerebral tumor or cerebral deformities. In eight of the remaining forty-three children, salaam convulsions occurred. In five of these eight children it proved possible to elicit the typical salaam attacks by means of injection of solution of posterior pituitary. Hyperventilation and alkalization were not tried in these children. Of fifteen children with pyknolepsy, fourteen developed pyknoleptic attacks following hyperventilation. Injection of solution of posterior pituitary as well as alkalization always gave negative results in this group of patients. However, alkalization elicited or increased the convulsive attacks in nine out of twenty children with genuine epilepsy; in six others the result was doubtful and in the remaining five entirely negative. The author con-

cludes that by means of one of the three tests (injection of solution of posterior pituitary, hyperventilation and alkalization) it will be possible to determine the nature of convulsions in many cases.

Klinische Wochenschrift, Berlin

15: 473-504 (April 4) 1936. Partial Index

*Functional Diagnosis of Aortic Disorders. H. Ude.—p. 476.
*Increase of Blood Pressure in Adrenal Stimulation and Hyperadrenalemia. K. Kuré, S. Okinaka, K. Ohshima, T. Shimamoto and D. Okamura.—p. 477.
Nature of Reducing Substance in Brain. A. Bonsignore.—p. 483.
Clinical Contribution to Question of Functional Disturbances of Cardiac Conduction. H. Marzahn.—p. 486.
Hypoplastic Diabetes of Young Persons. S. de Candia.—p. 488.
Question of Pigment Hormone and of Antidiuretic Principle of Hypophysis. M. B. Sulzberger.—p. 489.

Diagnosis of Aortic Disorders.—Ude points out that formerly the diagnosis of aortic sclerosis was based on such signs as the character of the second aortic sound, the amplitude of the blood pressure and the roentgenologic aspects. Later, various methods were devised to determine the volume elasticity. These were based on studies in which the mutual dependence of the factors controlling the circulation was mathematically formulated. Since most of the latter methods require considerable time, the author devised a simpler method which, although it does not give definite figures, nevertheless indicates the presence of changes in the aortic wall. He points out that the speed of the pulse wave passing along the aortic tube depends on two factors, the pressure in the arterial system and the elasticity of the arterial wall. The pulse wave that originates in the heart reaches sites where it can be measured; namely, at the right wrist and at the femoral artery in the flexure of the groin. These pulse waves have in common only the short section to the branching off of the innominate artery. If vascular changes exist on the way from the aorta to the groin, but not on the way to the radial, there must be a difference in time of arrival of the pulse wave at the wrist and in the groin. Since blood pressure changes practically have the same effect throughout the system, they do not influence the time difference in the arrival of the pulse waves. However, isolated changes in the aorta can be detected in this manner. Cases in which there is sclerosis of the arteries of the arm must of course be excluded. These sclerotic changes can be detected by palpation. Another important factor for a comparison of the time of arrival of the pulse wave at the wrist and in the groin is a constant ratio in the length of the two arterial tracts. In normally proportioned subjects this is always the case, and others must be excluded from this test. The author determined the time difference in the arrival of the pulse wave at the right wrist and in the groin on healthy persons and on patients with various defects of the aorta (aortic sclerosis and syphilitic aortitis). A tabular report of the results indicates how clearly changes in the aortic wall manifest themselves by a time difference. Aortitis and sclerosis show the same behavior, which is understandable when it is considered that in both cases the elasticity of the aortic wall is impaired. Independence from the blood pressure was proved by control tests.

Increase of Blood Pressure in Adrenal Stimulation.—Kuré and his associates point out that, whereas some investigators observed a hyperadrenalemia in essential hypertension, others denied it, and that it has been repeatedly determined that atropine exerts a favorable influence on hypertension. These and other problems induced the authors to investigate the reliability of the method used for the determination of adrenalemia, the relation between increased blood pressure in case of adrenal stimulation and hyperadrenalemia and finally the influence of atropine on hypertension. The results of their investigations indicate that the method, which had been employed for the determination of hyperadrenalemia, is sufficiently exact. They found further that the stimulation of the splanchnic nerve, particularly of its spinal parasympathetic fibers, always produces a noticeable increase in the blood pressure and hyperadrenalemia. Increase in blood pressure and hyperadrenalemia usually run parallel, but occasionally they differ considerably. The increase in blood pressure may be considerable in the case of slight hyperadrenalemia and vice versa. The stimulation of the splanchnic terminations in the adrenals produced similar results. It appears that the increased blood pressure in the presence of slight hyperadrenalemia is due to a functional disturbance of the adrenals. The authors cite explanations that have been given by other investigators and also describe some of their own observations, and suggest that the adrenals eliminate a blood pressure increasing substance, which does not produce an epinephrine reaction with the method that was used for these tests. They assume that in certain cases the adrenals secrete a substance that exerts a stronger effect on its own vessels than on the vessels of the ear of the rabbit, or that it acts on other incretory glands and only secondarily on the vessels. Whether this substance originates in the cortex or in the medulla of the adrenals is still unknown. To be sure, these observations do not prove that every essential hypertension is caused by a hyperfunction of the adrenals. It was determined further that atropine has a paralyzing effect on the splanchnic terminations and thus inhibits blood pressure.

Medizinische Klinik, Berlin

32: 473-512 (April 9) 1936. Partial Index

Clinical Aspects of Gastroduodenitis. G. E. Konjetzny.—p. 473.
Course of Regeneration of Muscle Fibers After Impairment of Muscular Tissue. A. Schmincke.—p. 475.
Rickets and Premature Ossification of Cranial Sutures. A. Materna.—p. 478.
*Is Endo-Urethral Electrotomy an Advance in Surgical Treatment of Hypertrophy of Prostate? H. Wildegans.—p. 484.
Aspects of Cranial Osteomas and Frontal Hyperostosis. E. Schneider.—p. 487.
*Sternal Puncture in Diagnosis of Leukemias and Related Disorders. H. Schulten.—p. 490.

Endo-Urethral Electrotomy for Prostatic Hypertrophy.—Wildegans says that the endo-urethral punch methods (Young, Caulk) are not in use in Germany, but that McCarthy's method of electrotomy is employed. It is performed either with McCarthy's electrotome or with the instrument of Heynemann-von Lichtenberg. He emphasizes that electrotomy is not an intervention that can be done without preparation, but he stresses that it requires the same preparation as does a prostatectomy. He considers unsuitable for electrotomy all patients with advanced intoxication by urinable substances. Moreover, a vesical fistula should, if possible, be avoided prior to electrotomy. The possibility of free movement of the instrument in the posterior urethra and good vision are essential. The author regards as unsuitable for resection patients who always have hemorrhages in the course of the introduction of the cysto-urethroscope. It is also important that the urinary tract is free from severe infection. Advanced cystopyelitis-nephritis and infections in the region of the prostate and of the seminal vesicles contraindicate endo-urethral treatment. The author regards the isolated hypertrophies of the median lobe and the rarer pedicled adenomas at the neck of the bladder as best suited for the electrotomy. He says that the intervention should be more canalizing than excavating and he thinks that the selection of the correct sites for resection is more important than the mass of the resected tissue. The opinion of McCarthy and Davis that the endo-urethral method is applicable in 90 per cent of prostatic changes is not shared by the author. He points out that, because it is only a palliative method and does not promise anatomic cure, the endo-urethral therapy cannot replace the radical operation. He thinks that a final evaluation of the endo-urethral electrotomy is not possible as yet, but he regards it nevertheless as a considerable advancement in the treatment of hypertrophy of the prostate.

Diagnostic Value of Sternal Puncture.—Schulten demonstrates that the examination of a specimen of bone marrow which has been obtained by sternal puncture does not clarify all obscure hematologic cases. For instance, in chronic myeloid leukemia the bone marrow specimen withdrawn by sternal puncture usually provides but little information. To be sure, the number of myeloblasts and of premyelocytes is usually increased, but it is often difficult to determine how many come from the admixtured blood. Moreover, the cases with large numbers of leukocytes usually cause no diagnostic difficulties, but even the subleukemic and the aleukemic myeloses can be detected quite readily by a thorough examination of the blood. If myeloblastic leukemias are accompanied by greatly increased

leukocyte values, their recognition is not difficult, except that there may be doubts whether a lymphatic or a myeloblastic leukemia exists. Clinical and hematologic signs, however, usually will permit a differentiation. The situation is entirely different if the leukemia is temporarily or permanently aleukemic. In these cases, sternal puncture may be of considerable diagnostic help. Other conditions in which sternal puncture may be of value are the lymphatic and myeloblastic leukemias and multiple myeloma.

Wiener Archiv für innere Medizin, Vienna

28: 161-320 (Feb. 10) 1936. Partial Index

Chronic Tuberculous Polyarthropathias (Poncet Rheumatism) as Touchstone of Bacillemia Problem. W. Berger and P. Ludewig.—p. 161.
Roentgenologic Analysis of Constipation. R. Pape.—p. 181.
Large Doses of Galactose in Normal and Pathologic Conditions. Martina Bescós.—p. 197.
*Method of Fractional Withdrawal of Duodenal Contents at Short Intervals: Clinical Examination of Pancreatic Function: C'cn. W. Berger, J. Hartmann and H. Leubner.—p. 211.
Clinical Aspects of Extrasystolic Allorhythmia. V. Bloch.—p. 229.
*Subfebrile Temperatures. E. Lauda.—p. 271.

28: 321-480 (April 27) 1936. Partial Index

*Subfebrile Temperatures. E. Lauda.—p. 383.
Hyperglycemia and Glycosuria. A. Edelmann and G. Singer.—p. 397.
Diagnostic Value of Serum Coagulation According to Weltmann. R. Teufl.—p. 415.
*Glutamic Acid as Substitute for Sodium Chloride. F. Mainzer.— p. 439.
Anemia and Anoxemia of Cardiac Muscles. K. Paschkis.—p. 447.

Test for Pancreatic Function.—Berger and his associates describe a method which makes possible the determination of the action of the pancreatic ferment in the duodenal contents. The procedure is a functional test and is suited for studies on the physiologic and pathologic aspects of the external secretion of the pancreas. The duodenal contents are withdrawn by means of a tube at short intervals (every five minutes or, if the flow of the juice is profuse, every two or three minutes). This fractional withdrawal is continued for several hours. It is done while the patient is fasting, as well as after an oil tolerance test. The authors show that the exactness of this method surpasses that of other functional tests of the pancreas. It discloses disturbances of the pancreas (hypofunction as well as hyperfunction), which could not be detected by other methods. Moreover, by the use of the oil stimulus it makes possible the examination of the function of the gallbladder. This is important in view of the frequent concurrence of diseases of the biliary tract and the pancreas. The method makes possible at the same time the macroscopic, microscopic and bacteriologic examination of the pancreatic juice, the vesical and hepatic bile and the duodenal juice in their mixtures in the duodenum. The prolonged fractional withdrawal is less trying for the patients than may be assumed on first sight, but the efforts involved in the examination are considerable. The authors concede that the method still has defects, but they think that some of them can be eliminated. Nevertheless, they maintain that even in its present form the method has great value.

Subfebrile Temperatures.—Lauda designates as subfebrile temperatures slight increases in the body temperature which usually persist for long periods. He stresses that, whereas in some cases they differ from true fever only in degree, in other cases they differ from it in the essentials. In the presence of kryptogenic subfebrile temperatures, the first thought is usually of an infectious toxic process, quite often of tuberculosis, but other mitigated chronic inflammatory and septic processes are taken into consideration (tonsillitis, sinusitis, bronchitis, cystitis, pyelitis and so on). Moreover, febrile diseases, such as Brucella abortus infection and lymphogranuloma, may cause subfebrile temperature, and obscure neoplasms, such as hypernephroma, must be thought of. The author calls attention to protracted periods of increased temperature after febrile diseases, particularly after influenza. The protracted subfebrile temperatures after infectious diseases are most frequent in patients with an unstable sympathetic nervous system. These types of persons are also occasionally subject to a hyperthermia that is not a postinfectious condition. They are free from any pathologic condition that might result in increased temperature; the subfebrility is merely one of several signs of nervousness. These persons usually are characterized by vasolability, by rapid changes from reddening to pallor and from a sensation of heat to chills, and by cold extremities, dermographism, profuse sweating, tachycardia, tremors and diarrhea. Their moods are unstable and they are irritable and subject to depression. The increased temperatures may persist for months and even for years, but they may also disappear for a while and then return again. The definite diagnosis of the increased temperatures that are the manifestation of an unstable sympathetic nervous system may cause considerable difficulties. It may prove difficult to differentiate this condition from hyperthyroidism and tuberculosis. The author thinks that, on the whole, tuberculosis is diagnosed too often merely on the basis of increased temperatures and, as a result, many persons are sent to sanatoriums and subjected to treatment when they do not need it.

Glutamic Acid as Substitute for Sodium Chloride.—Mainzer directs attention to the efforts that have been made to find a substitute for table salt. It was the chief aim to replace the chlorine ion by a harmless ion that would have approximately the same seasoning effect. Several salt substitutes were prepared in which the chlorine ion was replaced, but the replacement of the equally objectionable sodium ion was not at all or only partly realized. The author cites factors which indicate that the disturbance in the renal function is highly important for the elimination of the sodium, chlorine and bicarbonate ions. He searched for a "salt substitute" that would meet the following requirements: 1. It should have the capacity to season. 2. It should resist meteorological conditions, particularly the dampness of the air. 3. It should be harmless for the organism. 4. It should be free from inorganic ions that tax the kidney. 5. It should be eliminated in a form readily managed by the kidney. He thinks that glutamic acid fulfils these requirements. After giving the chemical structure and describing the physical characteristics of the acid and its neutral salts, he says that animal experiments revealed that it causes no pathologic changes in kidney, urine or blood pressure. The monosodium salt has a strong seasoning effect (seven times stronger than sodium chloride) and is widely used for seasoning purposes in China and Japan. However, for the diet of patients with renal disease the author recommends the free *d*-glutamic acid rather than its sodium salt, because it is desirable to eliminate the sodium ion. To be sure, the seasoning capacity of the acid is considerably less than that of the sodium salt, but the quality of the taste is the same. The author is convinced that glutamic acid will exert no unfavorable influence on the renal function, but it will be necessary to examine whether it has an indirect influence on the elimination of other substances.

Wiener klinische Wochenschrift, Vienna

49: 417-448 (April 3) 1936. Partial Index

*Treatment of So-Called Idiopathic Dilatation of Esophagus and Esophagogastrostomy. H. Heyrovsky.—p. 417.
Innovations in Technic of Obliteration of Hemorrhoids. H. Schur.—p. 427.
Experiments on Treatment of Barbital Poisoning. R. Fischer and H. Salzer.—p. 429.
Clinical Observations in Treatment of Hypertrophy of Prostate. H. Angerer.—p. 430.

49: 449-480 (April 10) 1936. Partial Index

Relation of Hair Growth and of Falling Out of Hair to Endocrine System and Possibility of Endocrine Therapy of Baldness. R. O. Stein.—p. 449.
Lymphogranulomatosis (Hodgkin's Disease) and Nervous System. E. Risak.—p. 452.
*Inhibition of Menstruation by Estrogenic Substance. B. Zondek.—p. 455.
*Treatment of So-Called Idiopathic Dilatation of Esophagus and Esophagogastrostomy. H. Heyrovsky.—p. 461.
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Treatment of Congenital Luxation and Subluxation of Hip Joints Without Fixation. F. Bauer.—p. 466.
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Treatment of Idiopathic Dilatation of Esophagus.—Heyrovsky says that so-called idiopathic dilatation of the esophagus has been designated also as chronic cardiospasm, spasmogenic dilatation of the esophagus, mega-esophagus, achalasia and so on. These various terms are applied to a disorder in which dilatation and lengthening of the esophagus results

from a functional inhibition of the passage of food through the cardia. The author is convinced that only dilation of the cardia or a surgical intervention can effect a cure and he says that in milder cases dilation of the cardia from the opened stomach according to von Mikulicz or cardiomyotomy according to Heller is advisable. As a third intervention for cases of diffuse dilatation of the esophagus he mentions a method of cardioplasty in which Marwedel and Wendel utilized the principle of the Heineke-Mikulicz operation for pylorostenosis. After citing figures regarding the efficacy of these methods, he points out that he himself resorted to an anastomosis between the abdominal portion of the esophagus and the fundus portion of the stomach. He exposes the cardia, mobilizes the lengthened and dilated esophagus, draws it into the abdominal cavity and anastomoses it with the stomach. He performed two esophagogastrostomies about twenty-five years ago, in both of which the conditions were favorable for subphrenic anastomosis. Roentgenologic controls after more than ten years disclosed that the dilatation of the esophagus had completely disappeared. Later this anastomosis was done in a greater number of cases, either by the abdominal or by the transpleural approach. The evaluation of the results obtained by himself and others convinced the author that subphrenic esophagogastrostomy is the best method for severe cases.

Inhibition of Menstruation by Estrogenic Substance.—Zondek found that the normal menstrual cycle can be influenced by the administration of estrogenic substance, in that the menstruation is postponed. To produce this result it is necessary to administer at least 70,000 mouse units, but if 200,000 or 300,000 mouse units is given the result is more certain; that is, at least one third of the quantity of substance necessary for the proliferation of the uterine mucosa must be administered to produce amenorrhea. The earlier the administration is begun (best immediately after menstruation) the more certain is the action. The duration of the resulting amenorrhea is not in proportion to the dose. The menstruation is retarded by from six to seventy days. Estrogenic substance can inhibit or entirely prevent the premenstrual proliferation of the uterine mucosa. If estrogenic substance (at least 200,000 mouse units) is given at the premenstrual phase, the further proliferation of the uterine mucosa is retarded. Estrogenic substance inhibits also the development of the corpus luteum, so that a parenchymatous degeneration and shrinkage may be the result. The gonadotropic hormones of the anterior lobe of the hypophysis are involved in the mechanism of the inhibition (perhaps shift in the proportion of follicle stimulating to luteinizing factor). This is indicated by the increased elimination of the follicle stimulating factor in the amenorrhea produced by the administration of estrogenic substance. The author emphasizes that menstruation is a complex hormone process in which the gonadotropic hormones of the anterior hypophysis as well as the ovarian hormones play a part. He thinks that the production of amenorrhea by estrogenic substance is of clinical value.

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Differential Diagnostic Value of Percussion of Pathologic Aorta. N. G. Edelman and V. N. Panov.—p. 292.
Xanthosis. D. A. Kogan.—p. 294.

Ammonium Chloride Therapy of Edema.—Kanfor found that edema which proved resistant to the usual therapy rapidly disappeared on administration of ammonium chloride (from 8 to 10 Gm. daily) in a number of cases of chronic nephritis or nephrosis. He obtained the same striking diuretic effect with disappearance of anasarca in circulatory failure due to cardiac insufficiency. This was accompanied by a fall in the blood pressure and a slowing of the pulse. In some of his cases the effectiveness of both digitalis and ammonium chloride was only temporary. In such cases he found that alternating the digitalis therapy with that of ammonium chloride became again an effective means of producing diuresis. He likewise had cases in which the administration of ammonium chloride actually aggravated the anasarca and the patient's condition. He feels that ammonium chloride therapy is advisable in those cardiac cases in which digitalis has been ineffective and that when the two have lost their effect they should be alternated. Because of its diuretic effect, ammonium chloride can be administered without preliminary digitalization. The author found that the diuresis provoked by ammonium chloride was regularly accompanied by an increase in the urinary excretion of chlorides. This was not noted with regard to the urea excretion. The determination of the carbon dioxide tension of the alveolar air and of the ammonia excretion in the urine enabled him to evaluate the acid-base balance and the degree of the developing acidosis. Since the acidosis resulting from the administration of ammonium chloride did not always produce diuresis but in some of the cases actually aggravated the condition, he concludes that acidosis is not the determining factor in the mechanism of diuresis caused by this drug. The fact that excretion of the chlorides in the urine was in excess of that administered in cases of increased diuresis suggests that dissociation of the ions of ammonium chloride leads to their combination with sodium ions and that the excretion of the latter from the organism initiates the mobilization of the retained tissue fluids.

Functional Cardiac Murmurs.—Bystritskiy divides functional murmurs into "muscular" murmurs, which are associated with some disturbance of myocardial function of contraction and tonicity, and "accidental" murmurs due to a variety of causes but not related to myocardial function. The muscular functional murmurs are heard best at the apex, while the accidental murmurs are heard best at the base of the heart at the mouth of the large vessels where they originate. The muscular is a delicate blowing murmur, which is heard better when the patient is lying down. It is characterized by its inconstancy and disappears or at least diminishes in intensity but is never intensified on exercise. The first heart tone may be weakened or in part be replaced by the murmur, but it does not disappear. The area of radiation is smaller than with organic murmurs. It never extends beyond the left parasternal line and is thus limited to the space between that line and the left border of the heart. The author investigated the state of myocardial function in 583 cases of functional murmurs heard at the apex and demonstrated the presence of disturbance of myocardial function in 82 per cent. In a group of cases in which the murmur was heard at the base, myocardial function was disturbed in only 12 per cent. The author points to the well known frequency of functional murmurs in pregnancy. Their mechanism was variously ascribed to the increase in the blood volume and the amplitude of the systole, the acceleration of the blood stream, the lifting of the diaphragm, and only exceptionally to toxic lesions of the myocardium. He found in his study of 230 pregnant women that the functional murmurs were almost always localized at the base. He concludes that these are accidental murmurs not related to the myocardium and that recognition of muscular functional murmurs is of diagnostic value because, besides the ruling out of an organic valvular lesion, it points to disturbance of myocardial function. The value of accidental murmurs to the cardiologist is questionable because of the multiplicity of conditions that can cause it.

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*Tularemia—Disease of Lemmings. E. Sylvest.—p. 307.
Comparative Iron Treatment of Anemias in Chronic Infectious Arthritis and Faber's Syndrome. A. Nyfeldt.—p. 310.
Weil's Disease in Fyen: Dog as Carrier of Infection; New Case. E. Jacobsen.—p. 314.
Epidemiologic Observations in Two Cases of Preparalytic Acute Anterior Poliomyelitis. J. Boas.—p. 316.
Danger of Lead Poisoning in Use of Ethyl Gasoline. G. Lind.—p. 318.

Tularemia—Disease of Lemmings.—Sylvest says that the fact that lemmings (Myodes lemmus) in their migrations in great numbers at certain times are attacked by infectious disease and die and that simultaneous diseases occur in man has been known in Norway for centuries. Lemming fever was reported in 1532 by Jacob Ziegler, and Ole Woem's description (Historia Animalis, 1653) has now been verified as to both the clinical picture and the source of infection. Tularemia and the disease of lemmings are believed to be identical.